MICROTONALIS:
A SYSTEMATIC APPROACH TO MICROTONAL COMPOSITION

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Microtonalis: A Systematic Approach to Microtonal Composition is a complement to existing (Western) microtonal practices, which usually focus either on the quality of tuning ratios, via the harmonic series, or the spectral analysis of sound—both very vertical in nature—with very little attention given to how microtones may or may not move and/or function on the linear plane. This study proposes and delineates a method, or technical structure, for the systematic movement of microtones in both melodic and harmonic spheres, bridging the gap between European and American microtonal practice by adapting well-known operations from tonal and post-tonal music.

The main theory informing this study is my personal approach to pitch multiplication, wherein intervals of a previously existing parameter (i.e., a scale, mode, melody, or chord) are multiplied by decimal increments (0.5, 1.5, 2.5, etc.) to create microtonal (quartertone) contractions or expansions. These mutations of familiar structures form new parameters, each of which possess a novel character, and which retain the specific functions, be they tonal or serial, of the original version.

After introducing this theory, I describe 1) the specific qualities of microtonal intervals—their unique character traits—and 2) how microtones

can be applied to a host of tried-and-true techniques, such as serialism, neo-Riemannian theory, the counterpoint of Bach and Brahms, and the modes of Messiaen. I then demonstrate how certain of these concepts are used in my own compositional work.

BIOGRAPHICAL SKETCH

Composer, conductor, and mandolinist Jesse Jones (b. 1978) is an American artist of wide-ranging tastes and influences. His music has been performed across North America, Europe, and Asia, and has received numerous accolades both at home and abroad. Jones has been honored with the Elliott Carter Rome Prize in Composition from the American Academy in Rome, a Barlow Commission, the Susan and Ford Schumann Fellowship from the Aspen Music Festival and School, and the Charles Ives Scholarship from the American Academy of Arts and Letters. He has also been awarded the Mary Greves Fellowship from the Tanglewood Music Center, the Heckscher Prize in Composition from Ithaca College, and the Sage Fellowship from Cornell University. Jones has participated in the Underwood New Music Readings of the American Composers Orchestra, received fellowships and honors from the University of Oregon, and enjoyed awards from ASCAP. Jones's music can be heard on Albany Records, and his choral music is published internationally by Earthsongs.

The American Composers Orchestra, the Cornell Symphony and Wind Ensemble, the Oregon Composers Orchestra, the New Frontiers Chamber Orchestra, the Grande Ronde Symphony Orchestra and others have presented Jones's orchestral works. Others of his compositions have been programmed by the Camerata Notturna, the Argento Chamber Ensemble, the Open End Ensemble, counter)induction, Pulse, the Momenta and iO String Quartets, the New Fromm Players, the Ithaca College Contemporary Ensemble, the Aspen Contemporary Ensemble, the Israeli Chamber Project, Ossia, So Percussion, FIREWORKS, and the Eugene Contemporary Chamber Ensemble. Jones has been commissioned by soloists such as Joseph Lin (violin), Kenneth Meyer (guitar), and Jeff Zeigler (cello), by the Scharoun Ensemble (of the Berlin Philharmonic), and by the Juilliard String Quartet.

Jones holds a DMA in music composition from Cornell University, where he studied composition with Steven Stucky, Roberto Sierra, and Kevin Ernste, as well as piano with Xak Bjerken. In 2007, Jones earned his Master's degree in composition from the University of Oregon, under teachers David Crumb and Robert Kyr, and in 2005 his Bachelor's degree from Eastern Oregon University, under John McKinnon and Leandro Espinosa. In 2012, Jones was appointed Assistant Professor of Composition and Theory at the University of South Carolina.

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INTRODUCTION

At the Pool

In a treatise published in 1970, composer and theorist George Whitman described microtonality as a vast swimming pool next to which composers stand "gingerly" to test the waters.[1] One can imagine a group of composers standing in bathing suits, sunscreen on their noses, some deciding not to get wet, others dipping a timid toe, only to withdraw it. Some might dangle their legs in from the edge while others wade waist deep in the shallow end, and a few daring composers might jump headlong into the deep end from a diving board, mercilessly splashing onlookers.

If these were the microtonal swimmers of the '70s, the swimmers in this, the second decade of the 21st century look very similar to those of forty years ago. The spectralists and high modernists today are more at home in the water than out: they could be thought of as deep-end dwellers. Some composers use microtones frequently but not always, while others only employ them as an occasional, "out-of-tune" coloration. There are composers who consider microtonality, maybe in a sketch at home, eventually deciding it is not for them, and then there are those who don't even come to the pool because they don't like to swim.

Regardless of a composer's level of immersion in this mysterious pool, there remains one difficulty that inhibits true, musical progress: there is no

[1] Whitman, *Microtonal Music*, 4.

codified method for learning to compose with microtones. Not even the early and simple quartertone theories of Henry Cowell[2] and Charles Ives[3] are taught in schools. There are many dogmatic ideologies and arcane philosophies floating around, but no canonized method explaining exactly how to tread <u>all</u> microtonal waters.

The spectralist school has been teaching a very specific microtonal style for decades, mainly that associated with the exploration and manipulation of the harmonic series and natural sounds. The early work of French composers Gérard Grisey and Tristan Murail, in particular, has been extremely influential on modern composers, such as Magnus Lindberg, Jonathan Harvey, Kaija Saariaho, Georg Friedrich Haas, and myriad others. Indeed, the advent and development of electronic music, with its mathematical precision and seemingly infinite musical potential, has propelled spectralism of one sort or another into the technical kits of many composers writing today. It pervades today's musical culture. While its techniques are attractive, musical, and valuable to master, spectralism will not teach one how to fare in all compositional situations; its approach is too focused and specific, and that is a concern this study hopes to address.

In the meantime, on this side of the pond, the isolated school of American microtonalism has been preaching tuning ratios of just intonation, commas,[4] and limit scales, also for decades.[5] Intervallic purity has been their

[2] Cowell, *New Musical Resources*, 1958.
[3] Ives, *Quarter-Tone Impressions*, 1925.
[4] A unit (measured in cents) denoting the difference of pitches in varying tuning ratios.
[5] Harry Partch, Ben Johnston, Easley Blackwood, et al., are the main proponents of the American microtonal school.

focus, mostly in the context of tonality, forming microtonal scales that allow for non-beating intervals. A favorite language of this school is the 43-note scale, often referred to as the Genesis Scale, due to Harry Partch's introduction of it in a treatise called *Genesis of a Music*. This scale allows for pure, non-beating, "perfect" intervals, and is considered by many in this school to be the ultimate just tuning.[6] Also in popular use are prime limit scales that are comprised of intervals with tuning ratios limited to prime numbers, such as eleven, thirteen, seventeen, and so on. These ratios correspond to the prime numbered partials of the overtone series, and set a "limit" on how far up that series the scale can ascend for new ratios; the higher the limit, the more interval/pitch variety the scale possesses.[7] Any scale whose pitches are derived from harmonic series ratios, regardless of limit, fits into the broad category of just intonation.

Ben Johnston, one of the American school's leading proponents, himself an erstwhile disciple and student of Harry Partch, creates 8-note just-intoned scales from the eighth to fifteenth partials of the harmonic series, a 15-limit mode that is a purely tuned (and thus more "accurate") version of the acoustic scale. Johnston's String Quartet No. 9 uses 31-limit scales, and, as in most of his pieces, new pitches are produced through inversion and/or common-tone transpositions—a process of starting the scale anew on a scale degree of the original, thus creating a plexus of microtonal key areas.[8] This creates a music that possesses a very exotic and pure quality. Johnston's string quartets and

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[6] Partch, *Genesis of a Music*, 120–121.
[7] Ibid., 67–75.
[8] Gilmore, *Changing the Metaphor*, 478–479.

the Suite for Microtonal Piano stand out as major successes of this approach to microtonality.

Aside from Johnston's successes, the music that usually results from composers of this school is, with a few exceptions, conservative in style and not always pleasing to the ear. Nonetheless, the theories themselves possess a potential that keeps a few faithful composers interested. So far, American microtonalism has not won the mass approval and technical adoption among composers that spectralism enjoys. Perhaps it will come to prominence at some future date, possibly in non-classical realms. Justly tuned guitar necks are slowly gaining acceptance among fringe rock musicians,[9] and wonderfully inventive new instruments – electric and acoustic – are currently being developed that make the performance of justly intoned music more accurate and practical.[10] Nevertheless, wide-range acceptance of this type of music, among composers and listeners alike, is far distant at best.

Even if a composer masters both French and American microtonal techniques (something composers should do), he/she would still have only two specific microtonal tricks up his/her sleeve: this is not sufficient for composers who wish to fare well in all compositional conditions. Even within these two schools there is no well-established theory of harmonic construction,

[9] An internet search for 19-tone, for instance, results in pages of electric guitar players who have re-fretted the necks of their guitars to fit that tuning system. Each of them go on at length about the workings of the scale division, and then demonstrate, often very convincingly, how it is preferrable to an equal-tempered 12-tone division. One can find the same for virtually every common tuning system, and the level of inginuity within and commitment to microtonality, among these musicians, is quite encouraging.

[10] The Tonal Plexus from H-Pi Instruments is a powerful midi devise that makes available a host of microtonal divisions, all under the fingertips via a keyboard-like console, and the Fluid Piano of Geoff Smith, which allows for the easy retuning of its strings via a slider, is a wonderful invention that holds much potential for precise microtonality in acoustic realms. These are only two innovations in a field rife with inginuity and creativity.

nor is there a common language or notation among their respective practitioners. The result of this lack of organized instruction is a free-for-all that leaves microtonal composers to fend for themselves. This often forces them to remain in the shallow end of the pool, without the knowledge or technique to thrive in deeper waters. In this way the progression of microtonal music is stymied, left in the hands of enthusiastic but narrowly focused devotees.

There should be a way to provide a microtonal technique to composers of all aesthetic and cultural leanings: an approach that expands on musical techniques already present in a composer's toolbox. What is needed is a method that provides a clear foundation for microtonal techniques, but which also allows for freedom of style and mode of expression, a non-dogmatic, easy-to-understand resource in microtonal composition. This is the aim of the treatise at hand. It is hoped that the concepts presented here will help bridge the gap between the schools of thought mentioned above.

As part of his 1925 treatise on quartertone tonality, Charles Ives surmised that a new system of harmony would need to be adopted for microtones to work properly:

> How quarter-tones will affect tonality . . . involves so many considerations that I won't venture to say much about it . . . But it strikes me that a great deal depends on whether or not satisfactory scales can be developed.
>
> – Charles Ives (*Some "Quarter-Tone" Impressions*, 1925)

Above anything else, this study is an attempt at developing just such a body of scales and harmonic approaches, tools to encourage and further facilitate the use of microtones in modern composition.

Terminology

Before beginning in earnest, it is necessary to clarify the specific notations and terminologies that will be used throughout this study. To avoid confusion, the discussion and examples included here will focus solely on quartertone microtonality. Third-tone, fifth-tone (etc.), asymmetrically divided octaves, just intonation (etc.), and ethnic scales, while interesting and relevant, will remain mostly outside the purview of this study; all of the quartertone techniques discussed here can easily be applied to other microtonal models, in some way or another, if the reader wishes to explore further.

Equal temperament will be assumed and will hereafter be shorthanded as ET.[11] "Quartertone" will often be shortened to QT, "three-quartersharp" to 3Q♯ (Q♯ for "quartersharp" and Q♭ for "quarterflat"), etc. Also, the topic of "cents"[12] will necessitate shorthand; 50 cents sharp will be notated as +50c, and -50c for the opposite.

The term "quartertone" implies that a "tone" be split into four parts. In ancient times, a *tone* referred to a single step in a scale (such as a church mode), i.e. a wholetone.[13] Scales are generally broken down into two types of intervals: tones and semitones, or wholesteps and halfsteps. For our purposes, the ambiguous term "microtone" refers simply to any division of the "tone." Thus the halfstep, or semitone, is actually a type of microtone: it could more accurately be called a halftone, as it divides the tone in half. For example, C to

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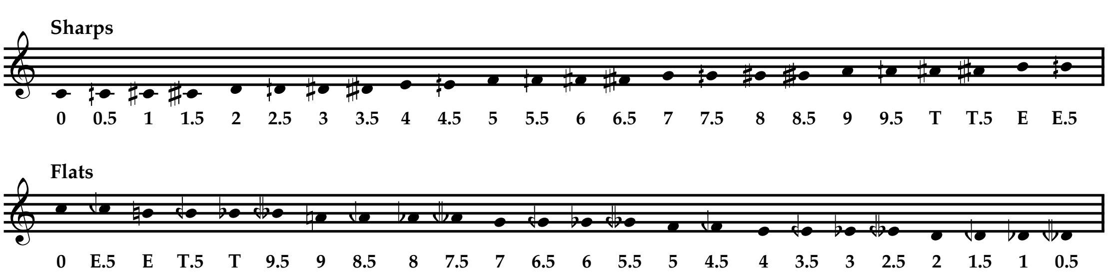
[11] The nature of tunings and pure intervals will not be discussed in this study.
[12] "Cents" are units of measurement for dividing the halftone into one hundred equal parts.
[13] Sadie, *New Grove Dictionary*, 599.

D would be a tone, and C to C♯ would be a halftone. The pitch exactly between C and C♯ would be a QT (C-Q♯, written C 𝄲).[14] The pitch precisely between C♯ and D would be C-3Q♯ (written C 𝄰). Flats are similar: the sequence of descending quartersteps from E would read, E, E-Q♭ (E 𝄳), E-flat, E-3Q♭ (E 𝄭), and D. Example 1.1 shows the range of QT pitches, as well as their enharmonic equivalents, within an octave. Also, for ease of reference, in a domain familiar to composers and theorists, integer notation has been provided. This system will prove especially useful in Chapter 6 of this study, where specific pitches and serial operations need mentioning (p. 54). For example, instead of referring to F-3Q♯, the simple number "6.5" can be used: F♯ is PC6 and G is PC7, so F-3Q♯ would be PC6.5, the QT halfway between PCs 6 and 7. Interval classes will also be referred to numerically, such as +4.5, -7.5, etc.

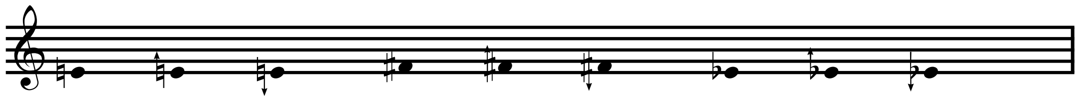
Example 1.1 – Integer Notation



[14] C-Q♯ must be exactly fifty cents away from both C and C♯ to be a true quartertone – even the slightest deviance to the left or right of 50c implies a different division of the tone. This applies to all quartertone divisions. In thirdtone divisions, each increment would need to be 33.3c sharper/flatter than the previous pitch.

Accidentals with arrows, as shown in Example 1.2, are often used in the literature in place of the convention just described:

Example 1.2 – Arrow Notation



While this notation is "easy to read," it is not representative of a precise location between ET pitches: it very vaguely represents any of a number of microtones flatter or sharper than the original. Therefore, whenever possible, such notation will be avoided.

CHAPTER 2

PITCH EXPANSION

Interval Manipulation

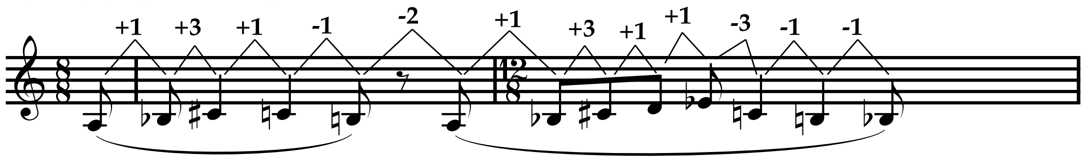
The primary theory informing this study is the concept of interval manipulation (expansion/contraction), as practiced in the 20th century by Boulez and Bartók, among others. This chapter is devoted to analyzing and explaining how and why interval manipulation works, theoretically and historically, and to applying its functions to microtonality.

In regards to pitch manipulation, many composers are attracted to mathematical precision and the numerous cross relations created by it. However, Bartók and Lutoslawski seem to rely on mathematical procedures only in equal proportion with composerly intuition and inner ear. In other words, arithmetic accuracy is not necessarily the goal in their music. Passages from the first and fourth movements of Bartók's *Music for Strings, Percussion and Celesta* exemplify this more intuitive (less strictly mathematical) expansion of pitch:[15]

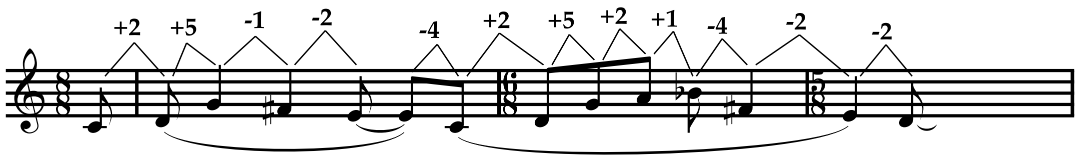
[15] Schuijer, *Atonal Music*, 79.

Example 2.1 – Bartók: *Music for Strings, Percussion and Celesta*

2.1a
1st Movement: mm. 1 & 2

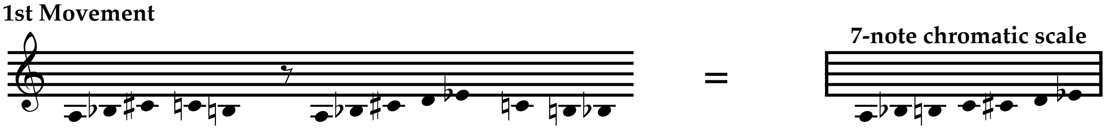


2.1b
4th Movement: mm. 204-206



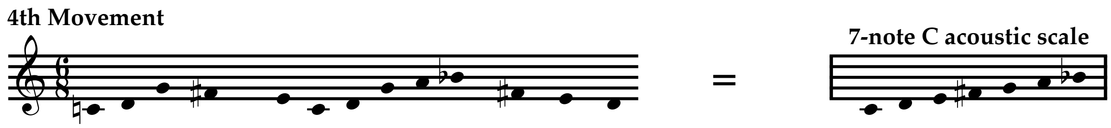
Notice, in Example 2.1b, that each interval seems to be enlarged by an indeterminate (non mathematical) amount: minor seconds are sometimes major seconds, but sometimes not, and minor thirds are expanded to either major thirds or perfect fourths. Bartók was not thinking mathematically here, rather he was thinking modally. If we line up the seven pitches in 2.1a in adjacent ascending order, we have full chromatic saturation from A to E-flat:[16]

Example 2.2 – Bartók: *Music for Strings, Percussion and Celesta* – reduction 1

1st Movement

The same procedure on 2.1b produces the C acoustic scale:

[16] Friedmann, *Ear Training*, 118.

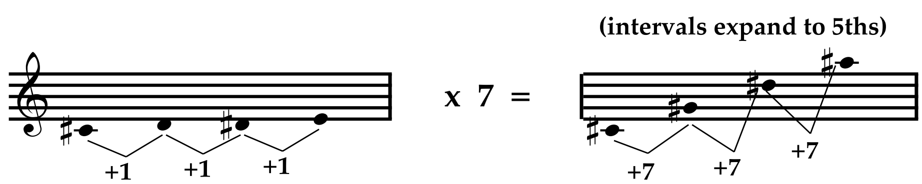
Example 2.3 – Bartók: ***Music for Strings, Percussion and Celesta*** **– reduction 2**



Here we see that the melodic contour of 2.1a has been manipulated (expanded) to fit into the parameters of the C acoustic scale (in 2.1b), one seven-note scale to another. This leads one to believe that in this instance Bartók considered modality more important than fixed mathematical precision.

This remapping of melodic contour onto different modal grids is one example of systematic pitch manipulation that is common in Bartók's music. However, as Michiel Schuijer shows in his 2008 book *Analyzing Atonal Music: Pitch-Class Set Theory and Its Contexts*, Bartók also used more precise pitch expansions in others of his works. Here is a classic and easy-to-grasp example from his Third String Quartet:[17]

Example 2.4 – Bartók: ***String Quartet No. 3*** **– reduction**



In this example, the intervals of a chromatic tetrachord are multiplied by 7 to produce a string of perfect fifths; this concept, which will later be applied to microtonality, is the seed that informs this study.

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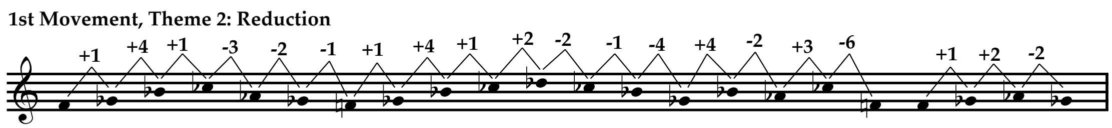
[17] Schuijer, *Analyzing Atonal Music*, 76.

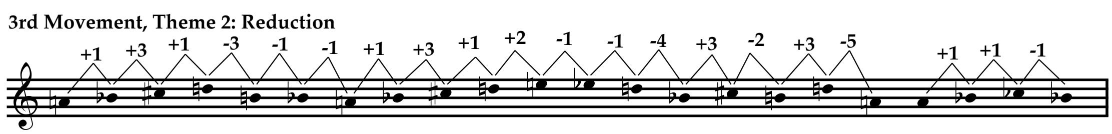
Lutoslawski, in the second theme of the first movement of his Concerto for Orchestra, employs a similar technique.[18] Here is the original melody, reduced to pitches alone:

Example 2.5 – Lutoslawski: *Concerto for Orchestra,* Mvmn't 1 – reduction



Here is the contracted version of that theme, found later as the second theme of the third movement:

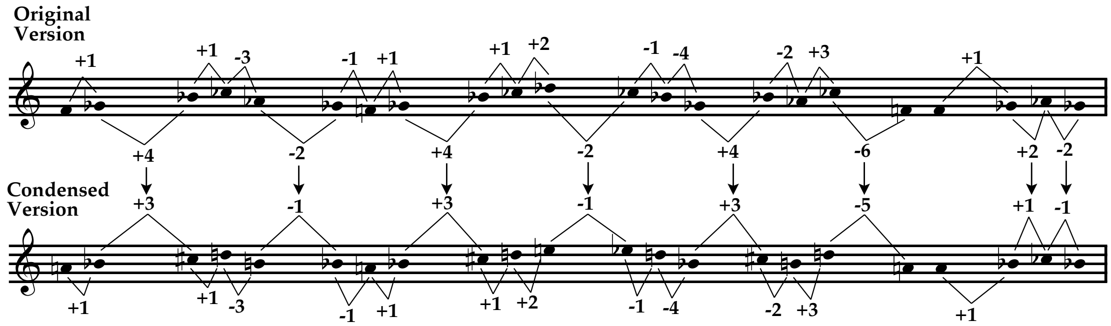
Example 2.6 – Lutoslawski: *Concerto for Orchestra,* Mvmn't 3 – reduction



Lutoslawski probably got this technique from Bartók, but the way he employs it in this example is slightly different: more methodical, perhaps, but still intuitive. Example 2.7 illustrates the intervallic similarities and differences between the two versions:

[18] Stucky, *Lutoslawski*, 56–57.

Example 2.7 – Lutoslawski: *Concerto for Orchestra* – interval comparison

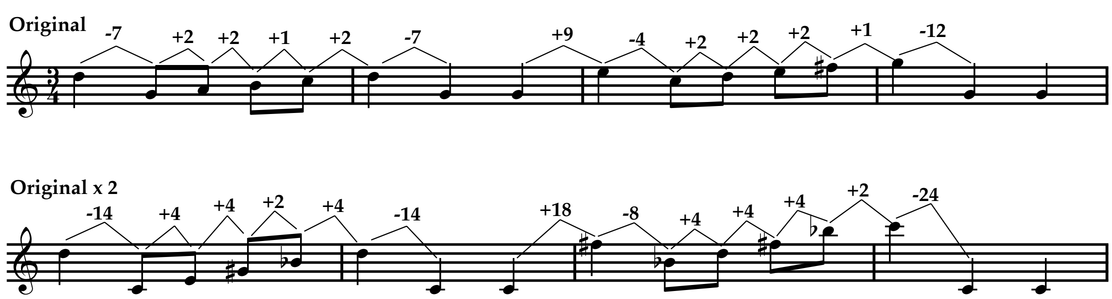


As one can see from this example, the melodic interval contour is mostly identical in both versions; the interval patterns outside the staves remain the same, while the intervals inside the staves are each reduced by one semitone – a halftone is subtracted from every interval. It seems Lutoslawski understood the most salient characteristics of the original melody, kept them intact, and then systematically reduced the interval size of everything else. For instance, the most memorable feature of the original is the upward halftone, a sort of leading tone that Lutoslawski keeps stationary (A and B-flat) in the second version. Here B-flat becomes the focus pitch and the other melodic fragments are simply drawn closer to it by pitch subtraction. It is remarkable how much the original melody's identity is retained in the contracted version, even though so many of its intervals are diminished. The essential character remains intact, but is now cloaked in a layer of mystery.

Multiplication

Regardless of a composer's approach to pitch expansion and contraction, the technique has long been considered a valuable compositional resource. Here is a simple explanation of how pitch multiplication – a more systematic approach to the same concept – works: if one were to multiply the interval of a halftone, between C and C♯, by 2, the resulting pitches would be C and D. The operation converts interval class 1 into 2, i.e. a halftone into a wholetone, via simple math. If one were to multiply IC1 (a halftone) by 3, IC3 (a minor third) would result: IC1 x 4 = IC4 (a major third), and so on. When a composer applies this technique to a string of notes, i.e. a melody, he/she can transform its entire intervallic makeup. The result is an expanded but related version of the original melody, a distant cousin that looks and sounds different, but that still bears a strong family resemblance. Using Mod12, a process that shrinks large intervals to their smallest equivalent form,[19] the composer can keep each multiplied pitch within a reasonable range. Here is a visual example of pitch multiplication, using a well-known melody:

Example 2.8 – Pitch Multiplication of Bach *Minuet in G*



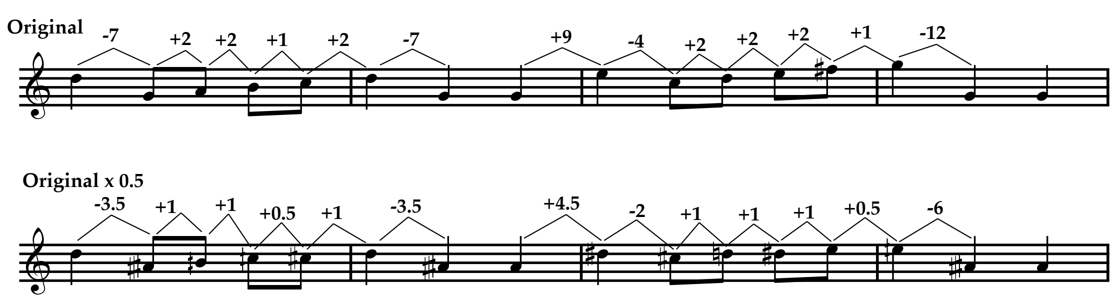
[19] Mod12 achieves this by subtracting as many 12s as possible from a given number in order to keep pitches within the range of an octave. Mod12 is only used for numeric simplification and ease of reference; the composer can of course place the resultant pitches in whatever range he/she sees fit.

Here each IC is multiplied by 2, doubling the size of the original intervals. This technique enables composers to spin out new pitches that are directly related to the original set of pitches. It creates both melodic and harmonic unity within a composer's resources. Essentially, this technique is a more mathematically precise version of the concepts at work in the music of Bartók and Lutoslawski, discussed earlier.

Micro-Multiplication

Just as multiplying by whole numbers systematically expands the intervals of a given pitch set, multiplying by decimals systematically contracts, or compresses them. For instance, multiplying the interval between C and C♯ by 0.5 would result in an intervallic shrinking to C and C-Q♯, converting IC1 into IC0.5, or a halftone into a QT. Multiplying any interval by 0.5 produces an interval exactly half the size of the original. Multiplying by 0.33 would result in an interval exactly one-third the size of the original; 0.66 would equal two-thirds; 0.2 would equal one-fifth, and so forth. Here is an example of this process, as applied to the same melody as above:

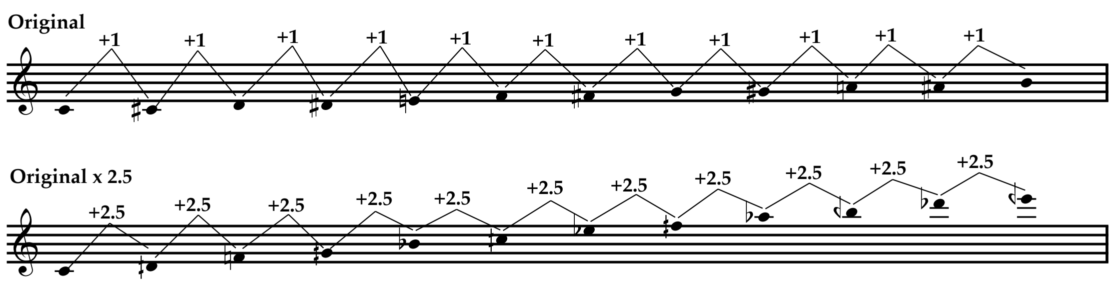
Example 2.9 – Microtonal Pitch Multiplication of Bach *Minuet in G*



This 0.5 multiplication cuts each IC of the original in half. As not every interval in this melody has an ET middle point, quartertones result—more on this in Chapter 3.

One can also multiply intervals by numbers such as 1.5, 2.5, and the like, creating QT pitch expansions.[20] Here is a chromatic scale with a 2.5 expansion:

Example 2.10 – Expansion (2.5) of Chromatic Scale



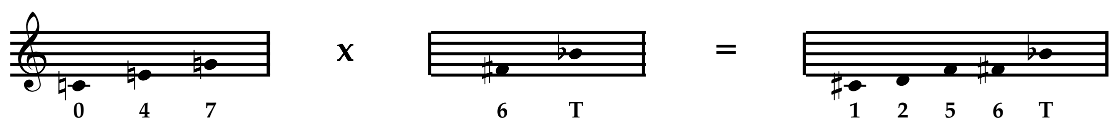
As it is easier for the listener to hear larger intervals, this sort of expansion is especially useful. The application of this expansion/compression technique to existing intervallic parameters, such as modes, rows and serial operations, harmonic fields, pitch rotations, interval cycles, and even major and minor scales, yields microtonal systems with defined intervallic content and specific, recognizable contour, something lacking in most microtonal theories. This theory creates a microtonal music that possesses intervallic identity, a crucial component for listener comprehension and perception. Herein lies its potential and power as an artistic resource.

[20] If one wished to perform compressions or expansions in fifthtone or sixthtone divisions, multipliers like 1.2 or 2.33 would be needed.

M-Transformations

In Boulez's music, pitch multiplication is very often a means for expanding harmony. In *Le marteau sans maitre*, Boulez began multiplying groups of pitches with other pitch groups,[21] one tetrachord partitioned from the tone row combined with a second partitioned chord, for example. If one takes the pitch set {0,4,7}, also known as C major, and multiplies it with some random dyad, say {6,T}, a new, larger set of {1,2,5,6,T} emerges, as shown here:

Example 2.11 – Basic M-Transformation



This process is called pitch multiplication, but the actual arithmetic function (as used by Boulez) is simple addition. The technique, boiled down to its basics, is the addition of each pitch's integer with every other integer, as shown here:

{0,4,7} x {6,T} (is actually addition)

0 + 6 = 6
0 + T = 10
4 + 6 = 10
4 + T = 14 (Mod12) = 2
7 + 6 = 13 (Mod12) = 1
7 + T = 17 (Mod12) = 5

List the sums in ascending order, and {1,2,5,6,T} results. Notice that PC 10 was repeated, and subsequently discarded. This technique, known as M-

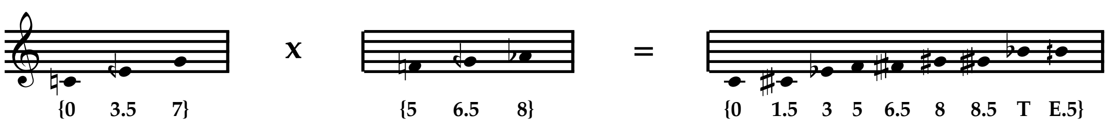
[21] Boulez, *Music Today*, 39–40.

Transformation, essentially weds two pitch sets and makes them produce offspring. As any two chords can multiply, this method provides a composer with a huge array of pitches that are all intimately "related" to the original set of pitches, producing something akin to a family tree.

Micro M-Transformations

Applying these techniques to QT microtonality yields similar but more complex results. Here is a multiplication of two random QT triads, {0,3.5,7} and {5,6.5,8}, a symmetrically split 5^{th} and 3^{rd}:

Example 2.12 – Basic Microtonal M-Transformation



The result, arranged in ascending order from C, is a hybrid version of the original two sets: {0,1.5,3.5,6.5,8,8.5,T,E.5}. This resultant set retains all the characteristics of its parent sets; its intervallic DNA consists of six perfect fifths (or fourths), and six slightly wide minor thirds (3.5s), which are salient traits of the original {0,3.5,7}; the resultant set also possesses three minor thirds (3s), and five wide minor seconds (1.5s), which happen to be the characteristic features of the original {5,6.5,8}. In addition, the resultant set possesses intervals that only occur between the two parent sets, such as the major second, of which the child has five. Oddly, the minor second that occurs between the father's PC7 and the mother's PC8 is missing in their progeny.

No matter, one can easily see (and hear) the family resemblance, and can appreciate the harmonic and intervallic integrity this particular expansion technique provides.

So far, I have discussed the basic techniques (or rules) of interval expansion and contraction—the basic operations that will be used throughout the remainder of this study—and have given two main examples of how they can be applied both melodically and harmonically to microtonality. Many other techniques will be discussed in the ensuing chapters, but all stem from these general concepts. My aim is to provide readers with an arsenal of techniques with which to confidently compose microtonal music, with the hope that some will expand on the techniques set forth here and eventually develop theories and/or techniques of their own.

CHAPTER 3

SYMMETRICALLY SPLIT INTERVALS

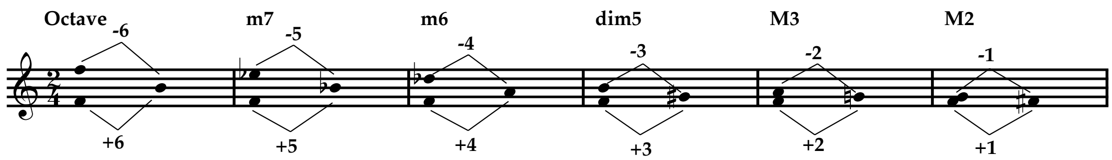
SYM Intervals

It is important, in any musical system, to understand the specific nature and unique qualities of the materials under use. Consequently, this chapter will focus on the specific types of intervals and harmonies one uses in a QT microtonal system—with special emphasis on stacks of like intervals and pitch fields—and will highlight some existing historical work undertaken by a handful of faithful practitioners.

Though it may seem simple-minded or mundane, a brief discussion of intervallic symmetry within ET is needed: not simply the symmetry achieved by stacking ET intervals, perfect fifths for example, but rather the symmetry held within each interval itself. In other words, where is the halfway point (or axis pitch) between any two ET pitches, and which intervals have no ET axis? This specific type of symmetry is important, though not commonly discussed in relation to dodecaphonic music, and it is integral to our understanding of the intervallic and sonic makeup of the microtonal theories discussed here.

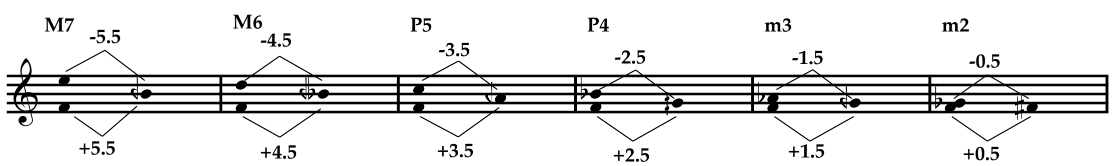
An octave is split directly in half by the tritone; a minor seventh is split by the perfect fourth; a minor sixth has the major third at its center; the tritone is evenly divided by the minor third; a major third has a major second in the middle, and the major second is of course divided in half by the halftone. In other words, evenly numbered intervals are evenly divisible by 2. These six interval symmetries are illustrated here:

Example 3.1 – ET Interval Symmetries



One need only think of the special quality of the wholetone scale, the augmented triad, the fully diminished seventh chord, or stacked fourths to appreciate the unique sonic qualities of their respective symmetries. But what about the other six intervals that are not evenly divisible in equal temperament: the minor second, the minor third, the perfect fourth, the perfect fifth, the major sixth, and the major seventh? Their center pitches are QTs. Would not their symmetries also possess similar qualities?

Example 3.2 – QT Interval Symmetries



These types of intervals will be referred to as SYM intervals.

An argument is often made that ET only possesses its special characteristics because of its ties to the harmonic series, and that because of this QTs will never function in the same way. This is partially true; QT chords will never ring as brightly and loudly as tonal chords, because of particular laws of acoustics that favor specially spaced tonal chords. This does not, however, mitigate their musical potential, possible functions, or expressive character, and should in no way discourage their use. Concerning ET, such an argument is mostly bogus; ET is itself grossly "out-of-tune," according to nature, and the human ear has adjusted to such a degree that pure intervals now sound strange, if not "wrong." The composers of the American microtonal school have devoted their entire careers to exploiting this fact; the reclaiming of intervallic and harmonic purity from the clutches of ET's tight hold is practically in their creed. ET should prove to us that the human mind/ear can grow accustomed to distortions of natural acoustic laws. Why then could the human ear not grow accustomed to QT harmony and counterpoint?

The idea that harmonic practice need not be solely based on the laws of nature was voiced over 130 years ago by one of the great 19th-century Renaissance men, Hermann Ludwig Ferdinand von Helmholtz (1821-1894):

> . . . the system of scales, modes, and harmonic tissues does not rely solely upon unalterable natural laws, but is at least partly also the result of aesthetical principles, which have already changed, and will still further change, with the progressive development of humanity.
>
> – Helmholtz (*On the Sensation of Tone*, 1879)

In Helmholtz's time, the symmetrical ET chords mentioned above each had a more unique character. The specialized, non-symmetrical tunings of instruments, which were common well into the 20th century, gave each key a very unique flavor.[22] Pianos, for instance, were tuned to facilitate music played in the most common keys, or for the specific repertoire a given artist

[22] Duffin, *How Equal Temperament Ruined Harmony*, 102–118.

was to perform.[23] Thus, in the 19th century, the A-flat major and E major sections of a single Schumann song (as in *Widmung*) sounded strikingly different in terms of brightness, character, beating, and intervallic purity, and in turn created an intense emotional shift.[24] This tuning practice surely affected (if not limited) the symmetrical qualities and/or subsequent functions of diminished and augmented chords, or French and German sixth chords, making certain modulations more or less startling or pleasing than their counterparts in other keys.

In true ET there is absolutely no difference in the ringing, beating, and sonic function of say A, A♯, or B augmented triads, or even major and minor chords. They are all tuned identically; C major beats the same as E major and G♯ major, and tonal movements function and sound exactly the same from key to key. Some claim that ET has turned a once wonderfully colorful art form into a monochrome shadow of itself.[25] This is perhaps too harsh a claim, but there is no contesting that the advent of ET has definitely changed the face and character of music.

If our musical perception is reduced, in essence, to a simple division of the octave into twelve equal parts, why then would divisions of the octave into more or fewer parts, say seven, eight, nineteen, or twenty-four parts, not also possess similar, learnable, and hearable characteristics? Helmholtz thought they could, and so did another, more contemporary, yet still unsung

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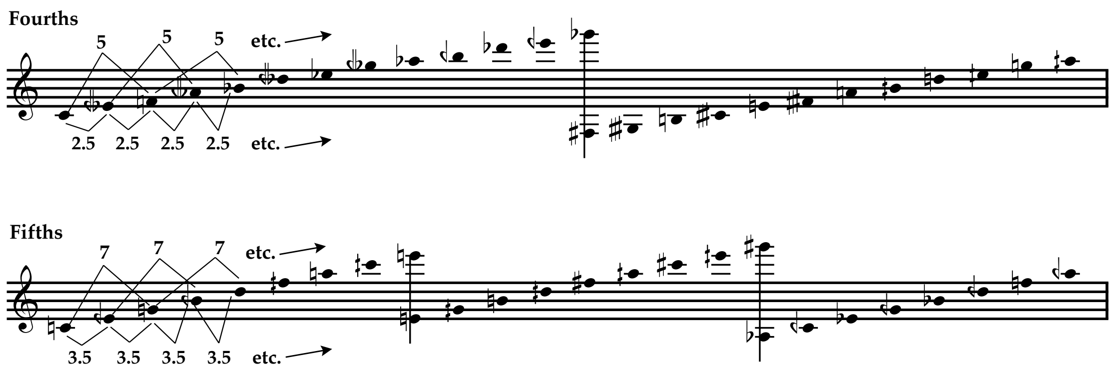
[23] Duffin, *How Equal Temperament Ruined Harmony*, 102–118.
[24] Ibid.
[25] Duffin's book, "How Equal Temperament Ruined Harmony," is a well-written and convincing example of this view. Also, the American Microtonal School's literature is rife with statements along these lines.

Renaissance man: Franco-Russian composer and theorist Ivan Wyschnegradsky.

Of all the pioneers of modern microtonal theory, none was more thorough and unrelenting than Wyschnegradsky. He spent the better part of the 20th century forming an extensive and intimate knowledge of microtonal harmony, writing copiously for octave divisions of 24 to 72. He owned a QT piano from the Foerster Company, as well as a QT harmonium, on which he composed a vast number of pieces.[26] Wyschnegradsky's voluminous theoretical writings, the best-known probably being *La loi de la pansonorité* (extant only in French), lays out in florid detail the depth of his theories on not only microtones, but on music's purpose in society, the beating qualities of certain chords, the cross rhythms those beats can create, music as an element of time, pitch density, and on and on. Of particular importance to the study at hand are the microtonal spaces Wyschnegradsky calls *échelles* or *espaces non octaviants* (scales or spaces that do not repeat at the octave).[27] Essentially, these *echelles* are chains of identical intervals that span across the octave, creating a larger harmonic space, which can either be played as one giant chord, or treated as a grid for melodic writing (thus the duality of *échelle* vs. *espace*). Stacked perfect fifths, for instance, span the length of the keyboard before octave equivalence occurs. Stacked perfect fourths, sixths, or sevenths, would be ET examples of *échelles non octaviants*. However, as Wyschnegradsky was mostly concerned with microtonal theory, his *espaces* (shorthanded hereafter as W-spaces) are a bit more complex.

[26] Gayden, *Wyschnegradsky*, 1–39.
[27] Wyschnegradsky, *La loi de la pansonorité*, 161–162.

The premise behind these W-spaces is the SYM interval concept discussed above. Wyschnegradsky would simply stack up QT SYM fifths, fourths, or sevenths, for example, creating far-flung harmonic interval stacks, each with very novel and distinct characters. Here are two examples:

Example 3.3 – W-spaces in Fourths and Fifths

Microtonal composers can use these spaces melodically in much the same way an ET composer uses quintal or quartal harmony. One could also treat them as troves from which to spin out melodic material, shifting every so often between spaces, much like Lutoslawski does with his stacked chords.[28]

Harmonic Qualities

> It is necessary . . . to point out what a great tendency there is, in theories of Harmony, to rely too implicitly on the argument derived from the appeal to the ear. It is assumed that because certain harmonical forms are approved, and certain others are disapproved by our ears, there is therefore some natural reason why they should be so. But this assumption overlooks how completely we are, in this respect, subject to the influence of habit and education.

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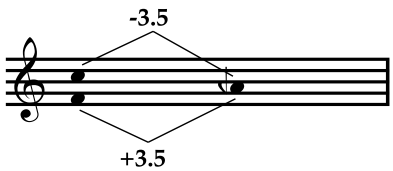
[28] For further study of Lutoslawski's compositional techniques see Stucky (*Lutoslawski & His Music*, 1981), and Bodman Rae (*The Music of Lutoslawski*, 1999).

> . . . this appeal to the ear must not be carried too far; and when the ear is appealed to to sanction complicated effects of harmony, it amounts simply to begging the question. We approve certain things, not because there is any natural propriety in them, but because we have been accustomed to them, and have been taught to consider them right; we disapprove certain others, not because there is any natural impropriety in them, but because they are strange to us, and we have been taught to consider them wrong.
>
> – William Pole (*Philosophy of Music*, 1877)

I agree with Sir William that, for a listener, an appeal to the ear in regards to aesthetics and critique can be problematic. However, as with ET, an understanding (theoretical and aural) of the basic sonic qualities of the materials being used, on the part of the microtonal composer, is of paramount importance. From the opening bars of a new composition it is obvious to the listener whether or not the composer understands his/her material, whether or not they are masters of the domain in which they are writing. Microtonal music already has a bias working against it, in that it sounds out-of-tune to listeners. If handled well, the novelty of a microtonal sound world, and the exoticism of a "new" harmony can intrigue even the most skeptical audience member, but if that bias is exacerbated by the composer not having harmonic or melodic control (or narrative purpose), the listener will immediately lose interest, dismiss the piece as hackneyed, and start watching the clock. Accordingly, microtonal composers must have an understanding of what character their harmony exudes, what impact certain chords possess, and what types of intervals and/or densities work in a given context. In short, they must know what their music sounds like. There is no substitute for hands-on experience, and one need only spend some quality, open-minded time with QT SYM intervals to sense both their beauty and their musical potential.

One of the easiest SYM intervals to hear is the SYM 5th:

Example 3.4 – SYM 5th

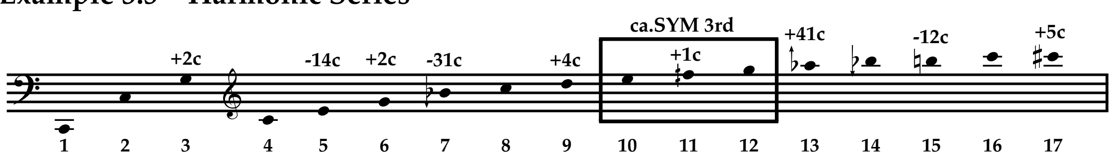


The mind's ear can easily recall the perfect fifth, as it can a major triad, or a minor triad. The middle pitch of a symmetrically split fifth is exactly between the minor and major third (50c sharper than the m3rd, or 50c flatter than the M3rd), and when played with the perfect fifth produces a triad that sound both major and minor, at the same time. This is the quality of the SYM 5th: an ambiguous character that is simultaneously major and minor, but also neither major nor minor. SYM 5ths seems to tug at the simple "happy-to-sad" or "light-to-dark" ratio often attributed to major and minor triads; they reside somewhere in between the two worlds, and because of this psychological ambiguity they possess a special power over the listener (N.B. the wonderful tonal ambiguities caused by SYM 5ths and other subtle QT mutations will be discussed further in Chapter 4). SYM 5th W-spaces possess a wonderfully open and bright quality, not too far removed from the sheen of stacked perfect fifths, but with a more jangly (i.e. beating) aura.

To my ear, stacked perfect fourths are slightly darker and more closed than stacked perfect fifths, and SYM 4th W-spaces have a similar relationship to SYM 5th W-spaces. SYM 4ths don't possess the same tonal (major-to-minor) ambiguity that SYM 5ths do, and the slightly smaller, denser intervallic makeup of SYM 4ths makes them sound darker and more reserved.

SYM 3rds are a special case in that they resemble an interval spacing found in the harmonic series. Partials 10, 11, and 12 of a C fundamental are highlighted in the following example. The 11th partial is 49c flatter than its ET counterpart, only 1c sharper than FQ♯:[29]

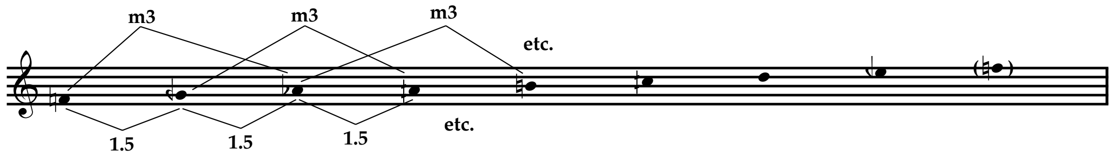
Example 3.5 – Harmonic Series



This connection to the harmonic series makes the SYM 3rd an especially useful and beautiful compositional resource; it produces very little beating, which of course helps with playability and tuning, and can also imply fundamentals—a decidedly spectralist mode of thought—to the QT harmony being used. Stacked SYM 3rds retain a very pure quality, but as they repeat at the octave they do not constitute a W-space. An interesting aspect of stacked SYM 3rds is the scale produced:

[29] Cents above the staff in this example (sharp or flat) indicate the degree of difference to ET.

Example 3.6 – Scale made of stacked SYM 3rds

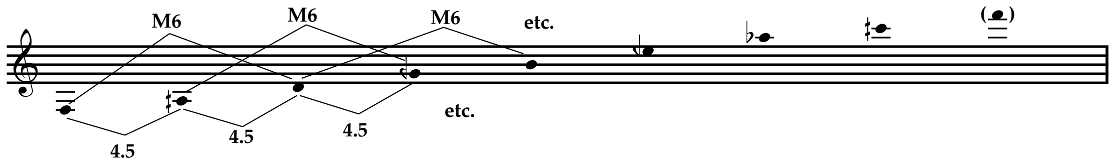


Stacked SYM 3rds produce a scale that splits the octave into eight equal parts, a scale that is actually not included in the most common microtonal scales section of the *Dictionnaire des musiques microtonales*.[30] This omission may be due to the fact that an 8-part division fits into a regular QT (24-part) division, but a scale where every step is a 1.5, or 150c wide, could be extremely useful; it possesses all the symmetrical charm of the wholetone scale, but with eight pitches rather than six. This phenomenon will be discussed further below.

In QT music, the SYM 2nd is the smallest and most dense SYM interval. Stacking them would produce a 24-note saturation of the octave, and the sonic result is analogous to ET's chromatic scale; the smallest interval produces the most acid results. SYM intervals create a range of pitch densities that decrease in intensity as they span out from the smallest spacing, with the exception of the SYM 3rd, which opens up due to its special relationship to the harmonic series, and because it possesses fewer pitches (8 versus 24). SYM intervals wider than a fifth (i.e., the major sixth, and seventh, and the minor ninth, etc.) vary greatly one to the next. A SYM 6th stack, or W-space, only produces eight individual pitches before regaining its starting pitch, as shown here:

[30] Jedrzejewski, *Dictionnaire des musiques microtonales*, 138.

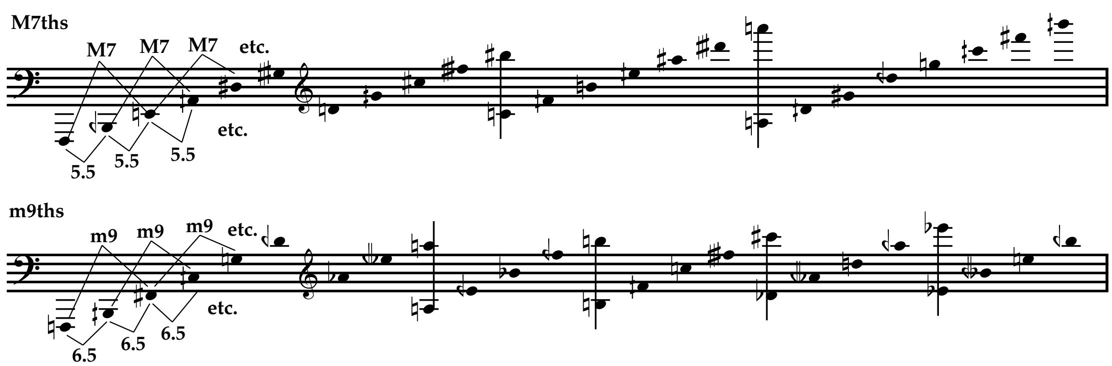
Example 3.7 – SYM 6th W-space



This SYM 6th W-space is simply a different sizing of the SYM 3rd stack. The pitches are identical, but the interval size has been tripled, thus creating a larger, less densely packed version of the same mode. A SYM 10th (symmetrically split minor tenth) would be an even farther-flung (quintupled) spacing of the same eight pitches.

SYM 7th and 9th W-spaces are reproduced here:

Example 3.8 – SYM 7th & 9th W-spaces



Both of these W-spaces produce all twenty-four pitches. They are so large that they extend well off a piano keyboard, and even out of the range of hearing. SYM 7ths and 9ths (split major sevenths and minor ninths) possess a very similar character, perhaps because they share, as their base of origin, the interval of a halftone. The beating is very similar between the two spaces, as is the basic character, and the only real difference is that the SYM 9^{th} sounds slightly more open, perhaps due to the larger interval size and the reduced number of pitches one hears as a result.

I have included these descriptions of W-spaces as a potential aid for composers to consult when wishing to understand the respective sound qualities of each. However, all this being said, the microtonal composer would do well to spend time with each of these intervals, and their respective stackings, in order to develop an individual relationship with their unique harmonic qualities, as well as a vocabulary and ear for their densities and beating auras. This relationship will assuredly be different for every composer, and supports the idea that there is no substitute for hands-on experimentation and experience.

Symmetrical Micro-Spaces

In his many compositions, Jonathan Harvey, a deeply religious British composer, uses what he calls "UR Spaces" to evoke in the listener a sense of mystic spirituality.[31] The word "Ur" is a prefix of German origin that usually refers to a thing in its earliest or original state, as *urtext* describes a text in its purest, unadulterated form.[32] Another meaning of "Ur," one more neatly aligned with Harvey's Buddhist leanings, is the concept of a deep, primitive, spiritual awareness, like something from the first impulse of mankind's subconscious. Combining these two definitions, one comes to a meaning that

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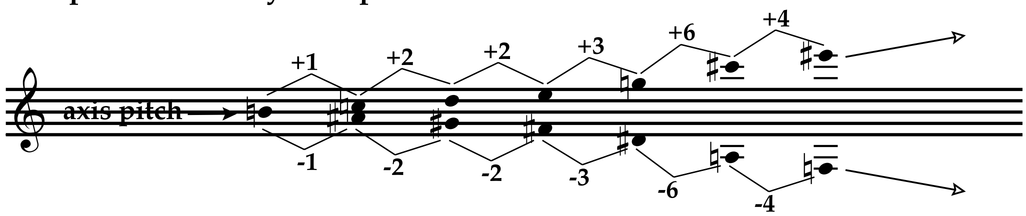
31 Downes, *Jonathan Harvey*, 87.
32 *New Oxford American Dictionary*.

fits Harvey's aesthetic perfectly: an UR Space is an original harmonic field that forms the basis of an entire composition—a source from which all musical elements flow—and which simultaneously projects a deeply spiritual, even primitive essence.

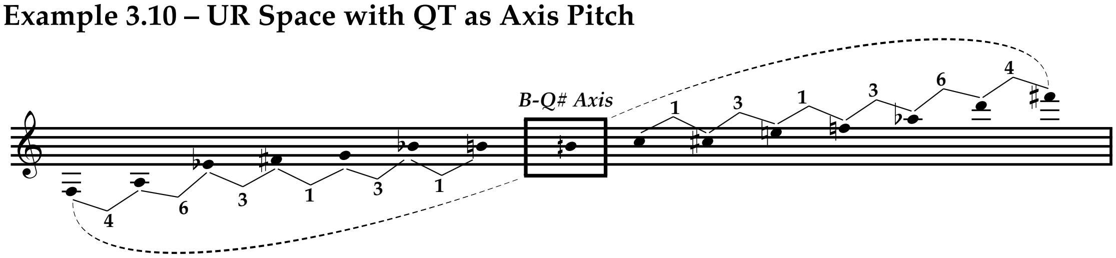
Mysticism aside, these UR Spaces are simply carefully constructed pitch fields that span out symmetrically from a central axis pitch,[33] as shown here:

Example 3.9 – Harvey UR Space



Often these axis pitches are QTs. Here is a slightly different space that spans out symmetrically from B-Q♯:

Example 3.10 – UR Space with QT as Axis Pitch



[33] Downes, *Jonathan Harvey*, 87.

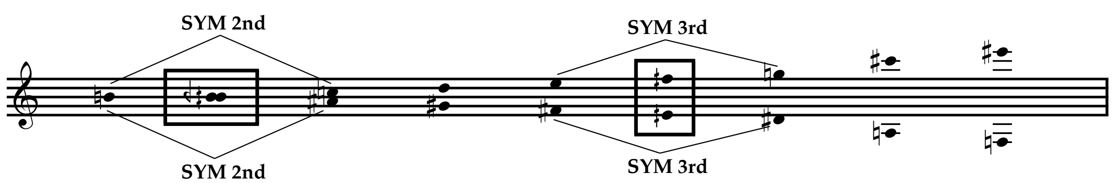
While Harvey only rarely includes the microtonal axis points in his compositions, at least not explicitly, it is helpful to study them: they validate the effectiveness of splitting intervals with QTs. One sees and hears in these spaces the potential of sounding the axis pitch; singing the microtone along with the space completely changes its character. In fact, splitting any of the SYM intervals in the space changes the character dramatically, somewhat supporting Harvey's view that harmonic spaces contain specific spiritual identities.

When used harmonically, microtones can produce a luminous, mysterious, and highly attractive (even mystical) atmosphere, and SYM intervals can add an extra shimmer and unity in ways random microtones cannot. For one thing, the particular beating created by a single microtone, or the combination of several, in an UR Space, can greatly transform the listener's perception. One can still perceive distinct pitches in an ET UR Space, but add one or more microtone in the mix and suddenly the space becomes its own sonic entity, one that no longer consists of individual pitches, somehow, but which emanates a more global, pulsating personality, like an actual physical object, devoid of specific parts, which takes shape like an apparition in the mind's ear. I believe this shift in listener perception, achieved through microtonality, changes the listening experience from one of passive pitch counting to one of a more metaphysical, transcendental nature: one that literally forces the listener, due to its utter foreignness and beauty, to listen in a different manner; to listen more with the soul than with the ears.

This is all fairly mystical and speculative, but it perfectly reflects how I feel when listening to Harvey's music. Such a transcendent experience is unequivocally what the composer is after.[34] After all, Harvey genuinely believes, and I tend to agree, that music can, under the right circumstances, help assuage human suffering.[35] Harvey's UR Spaces create this "spiritual realm" on their own, often within the confines of ET, but I believe the careful placement of microtones can greatly enhance the listener's depth of immersion into that realm.

Let's take a look at that second UR Space again, this time with each SYM interval filled in:

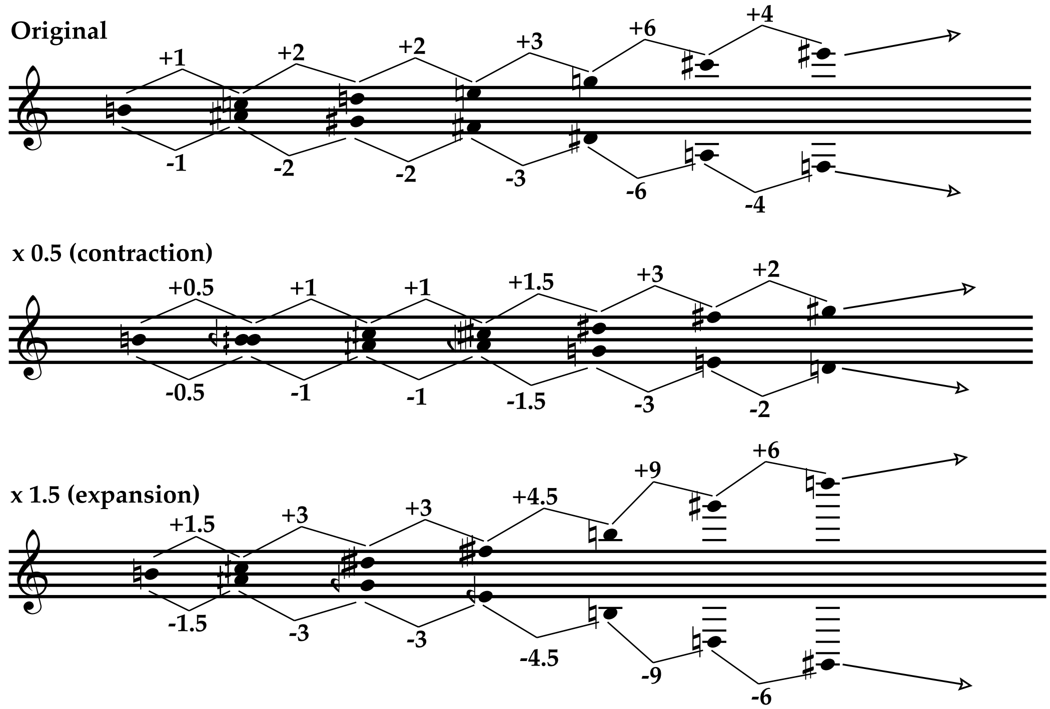
Example 3.11 – UR Space with SYM Intervals filled in



Filling in SYM intervals is only one approach to using microtones in regards to harmonic space. One could also take an ET pitch field or UR Space[36] and apply the interval compressions discussed above to produce an entirely new field. For instance, one can imagine multiplying each interval of a given space by 0.5 or 1.5, outward from an axis pitch:

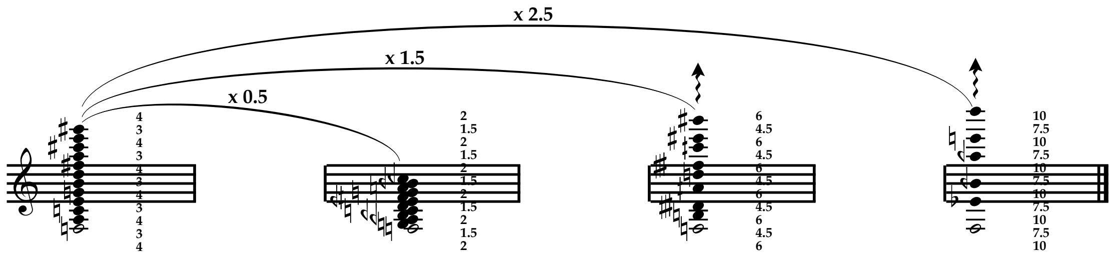
[34] Downes, *Jonathan Harvey*, 32–34.
[35] Ibid.
[36] With slightly more complicated calculations, this could of course be applied to microtonal spaces, as well.

Example 3.12 – UR Space Outward Contractions and Expansions



The results are compressed and expanded versions of the original space. As shown, these operations can be applied both to contract and to expand the interval size, multiplying each interval by 1.5 or 2.5 (or larger numbers), expands the size while the 0.5 contracts it. This technique can greatly serve a composer in smoothly transitioning from field to field. Depending on the size of interval in the space one wishes to reach, intervals in the first space could be contracted/expanded to make the transition more fluid.

Example 3.13 – Contraction/Expansion of Pitch Fields from Pedal Point



Whether these concepts are applied to UR Spaces, W-Spaces, Melodic Spaces or other musical parameters, they provide microtonal composers—regardless of their individual aesthetic, spiritual, or philosophical leanings—with a systematic and flexible harmonic tool.

CHAPTER 4

MICRO-NEO-RIEMANNIAN THEORY

Transformations and Relations

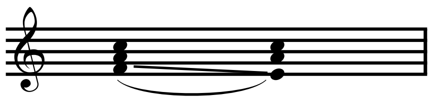
So far we have touched on microtonal composition in the context of pitch manipulation, specific approaches to intervallic and harmonic techniques, and somewhat esoteric serial methods, all mingled with historical precedents. This has been fixed in a mostly vertical (harmonic) domain, with little attention paid to the linear (melodic) capabilities of microtonality. Music is, after all, a linear art form, and so some time should be devoted to exploring microtonality in horizontal domains, as well. Also, up to this point, the focus has expressly avoided another realm in which microtones can be used to stunning effect: the tried-and-true functions of tonality.[37] Accordingly, the next two chapters are concerned with linear microtonal movements and functions, each related in one way or another to tonality. A perfect starting place is the introduction of neo-Riemannian Theory, a practice devoted solely to the elemental shifts in tonal voice leading and harmony.

Neo-Riemannian Theory is the study of how chords relate to one another by way of stepwise voice leading, not necessarily following the rules of functional tonality, where everything is related to a tonic.[38] For example, an

[37] "Tonality" here refers to the centricity formed by hierarchal chord relationships, i.e. harmonic function. A triad, in and of itself, can be tonal or not, but our focus will be on those that are.
[38] Gollin, *The Oxford Handbook,* 295.

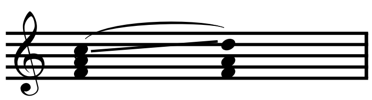
L-transformation[39] turns a major chord into a minor chord by simply lowering the root by a halftone—F major to A Minor, as shown here:

Example 4.1 – L-transformation



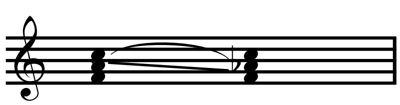
An R-transformation[40] achieves a major-to-minor exchange by moving the fifth of the chord up a whole step—F major to D minor:

Example 4.2 – R-transformation



Another neo-Riemannian exchange is the P-transformation,[41] which turns F major into F minor via halftone movement of the third:

Example 4.3 – P-transformation



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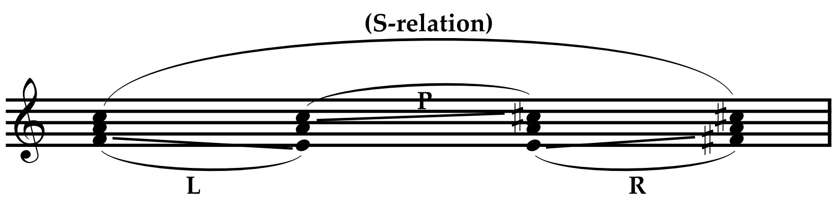
[39] The "L" is for "Leading tone exchange."
[40] "R" is for "Relative": it transforms a major chord to its relative minor by the simple movement of one voice.
[41] "P" stands for "Parallel," as the root and fifth of the chord remain unchanged.

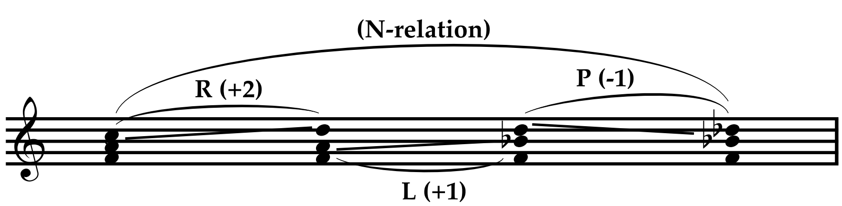
These transformations are the primary operations of neo-Riemannian Theory, and each can be worked in reverse, turning minor chords into major chords, as well. Strings of these fundamental transformations can be used to achieve larger-scale relationships. For instance, applying successively L, P, and R-transformations to a major chord produces something known as an S-relation.[42] The outcome is the gradual transformation of a major chord to its minor Neapolitan—F major to F♯ minor:

Example 4.4 – S-relation



By successively applying R, L, and P-transformations to a major chord, something known as an N-relation[43] can be achieved. This changes a major chord into its minor subdominant—F major into B♭ minor:

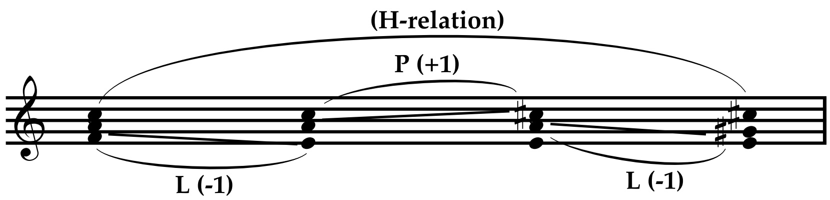
Example 4.5 – N-relation



[42] "S" is for "Slide," as if the outer voices of the chord were sliding to the next chord.
[43] "N" represents the German word *Nebenverwandt*, which means, roughly, "neighbor related": a term referring to chords borrowed from neighboring or slightly distant scales, much like modal mixture.

There is also an H-relation,[44] which by means of successive L, P, L-transformations, turns a major chord into its hexatonic counterpart. In other words, F major into C♯ minor:

Example 4.6 – H-relation



All these larger-scale operations can also be applied in reverse order.

This approach to music analysis can of course go much deeper than what has been mentioned here. However, for the study at hand, these basic operations will suffice.

Micro-Relations

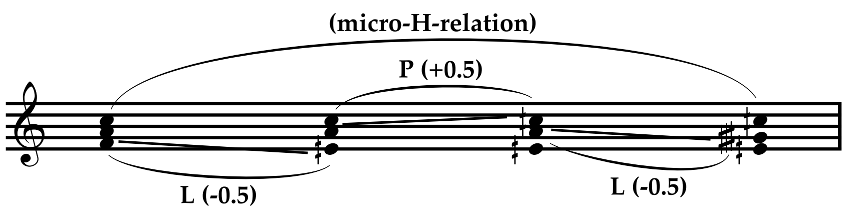
In applying these concepts to a microtonal model, there are two approaches: 1) keep the major chord size intact and multiply only voice-leading (linear melodic) intervals by 0.5; or 2) multiply every interval, including vertical intervals, by 0.5, which compresses the size of the original chords. The first option creates a microtonally blurry version of the original, while the second proves a bit more challenging to the ear. Let's focus on the first approach for a moment:

[44] "H" obviously stands for "Hexatonic."

Micro-Relations: Approach I

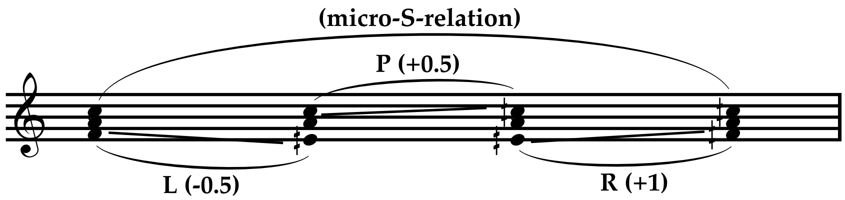
As shown in Example 4.6 above, if one starts with F major and performs a series of neo-Riemannian transformations on each successive chord, forming an H-relation, one arrives at C♯ minor.   What would happen if one performed these same voice-leading operations with micro-intervals, instead of ET-intervals, where every halftone is reduced to a quartertone?

Example 4.7 – micro H-relation



The result is a sort of smeared tonality, one that eventually culminates with a C-quartersharp augmented triad. Each voice is audible, and one can perceive the contour of each line, as in the original 12-note version. Each pitch moves simply to its upper or lower micro-neighbor, one by one, and does so obliquely to the other voices. This illustrates that micro voice leading, at its simplest, can be understood in the same way as conventional, tonal voice leading. One can hear linear movement by quartertone; this is key to writing contrapuntal microtonal music. Here is the micro version of an S-relation in F major:

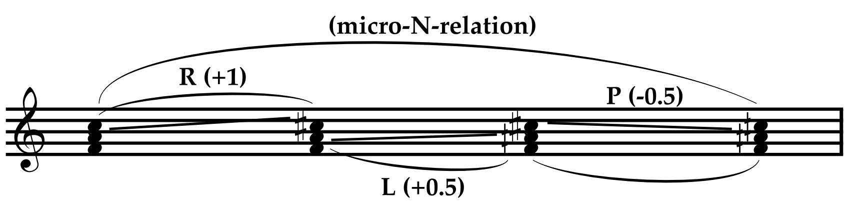
Example 4.8 – micro S-relation



This leads F major to a beautiful SYM fifth on F-quartersharp, transforming the role of the constant A-natural from an equal-tempered major third to a symmetrical third.

Here is the microtonal rendering of an N-relation, starting from F major:

Example 4.9 – micro N-relation

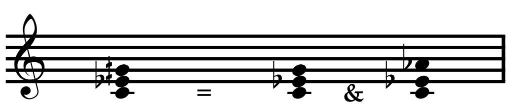


This relation twists the original F major into a triad that resembles A-Q♯ minor with a slightly sharp fifth (the F natural is a Q♯ higher than E-Q♯). An ET N-relation turns F major into its minor subdominant (B-flat minor). This micro version produces a chord just shy of B-flat minor. One can imagine the wonderfully blurry tonality caused by performing both ET and QT versions simultaneously. Of most interest, though, is the quality of the final chord. It holds an ambiguity between two chords: A-Q♯ minor and F-Q♯ major. The F-natural is halfway between the E-Q♯ and the F-Q♯, and, like the SYM 5th discussed earlier, creates an ambiguous relationship with the other two pitches that blurs the identity of the chord as a whole.

Tangent – Tonal Ambiguity

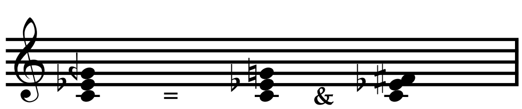
Let's pause briefly to discuss the aural effect and sonic ambiguities created by subtle, microtonal mutations of tonality, i.e. tertian triads. As mentioned in Chapter 3, if the third of a major triad is lowered by a QT, then the resultant triad sounds like a combination of both major and minor triads, while actually sounding like neither, at the same time. This same phenomenon occurs with virtually any triad. For example: raise the G of a C minor triad by 50 cents and a mixture of C minor and A♭ major results:

Example 4.10 – Ambiguity 1



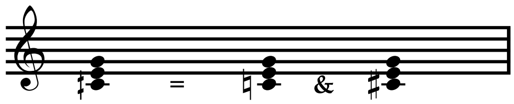
Lower the G of C minor and one hears a disturbing confluence of C minor and C diminished:

Example 4.11 – Ambiguity 2



Likewise, raise the C of C major and that chord is magically merged with C♯ diminished:

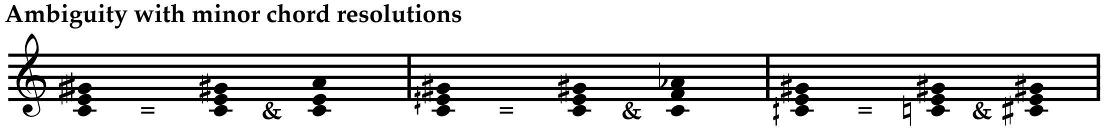
Example 4.12 – Ambiguity 3



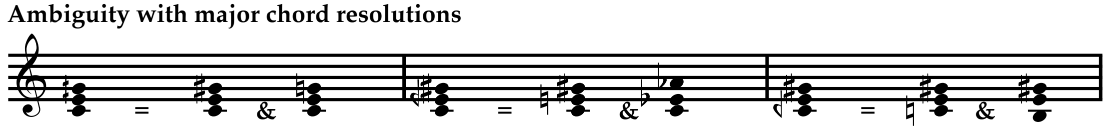
Raising any one of the pitches of an augmented chord (my personal favorite) unites it with one of its natural minor chord resolutions, and lowering them results in a beautiful combination of its major chord resolutions:

Example 4.13 – Augmented ambiguities

Ambiguity with minor chord resolutions

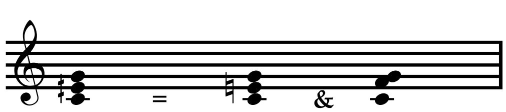


Ambiguity with major chord resolutions



Raising the E in a C major triad by 50c marries the qualities of a 4-3 suspension and its resolution.

Example 4.14 – Ambiguity 4



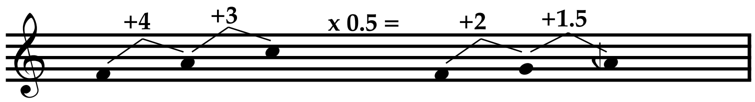
The list of possibilities goes on and on, and also applies to four-note chords; one could see how lowering the G in a C^7 chord could blend the function of that chord with the French sixth, for instance. One can imagine the luminous hybrid combinations of more complex 5, 6, or 7-note chords, with microtonal manipulation of more than one chord tone; $C^{\#}\mathrm{dim}^7$ with a raised C♯ and a lowered B♭ would probably yield interesting results: perhaps a mixture of C♯dim^7 and D minor.

I have been describing these chords as microtonal combinations or mixtures of two triads, but this is not quite right; they do sound like two simultaneous chords, but they also sound like neither chord, at the same time. The listener cannot discern which of the two chords it is, because what they are hearing is its own chord, an ambiguous entity exuding its own particular character and beauty. These chords are like ghosts or shadows of the two triads they imply. They use tonality to suggest a different musical world. Place such microtones in chords not specific to tonality, and they likewise create their own sonic implications.

Micro-Relations: Approach II

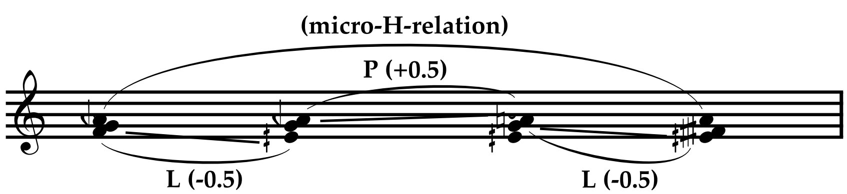
Now let's return to the main topic, to have a look at the second method of applying microtonality to neo-Riemannian practice. This second method requires a new definition of "F major." By multiplying the vertical intervals from F by 0.5, a new chord is derived: F, G, and A-Q♭, as shown in example 4.15:

Example 4.15 – 0.5 multiplication of F major



The interval from F to A, a major third or interval class 4, is compressed to a major second, or IC2. The perfect fifth from F to C (IC7) by the same multiplication becomes a wide minor third (IC3.5). The result is a systematic microtonal compression of an F major triad: F, G, and A-Q♭.[45] From here the same voice leading rules can be applied, producing intriguing, if slightly more acid harmonic progressions. Here is a rendering of an H-relation in this new model:

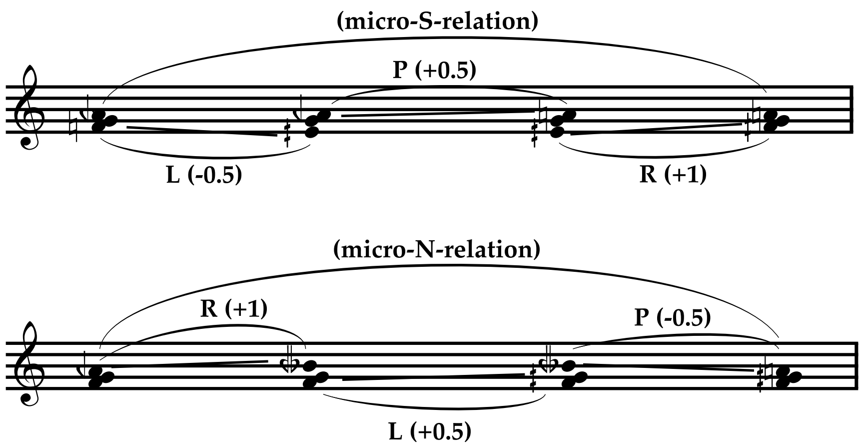
Example 4.16 – Micro H-relation



[45] A major chord is just an arbitrary model, chosen as a familiar starting ground, but such operations can of course be applied to any grouping of pitches.

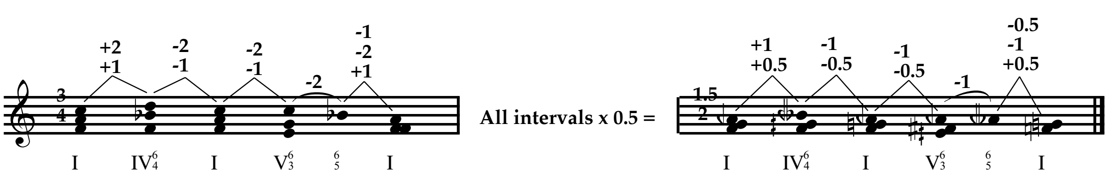
Here are S- and N-relations:

Example 4.17 – Micro S- & N-relations



An interesting feature of this fully compressed approach is that suddenly, with no tonal implications weighing on the ear, even the simplest voice leading operations sound novel. Yet, they do not lose their power of movement and closure. Take, for example, a fully compressed I-IV-I-V-I cadence in F:

Example 4.18 – Micro I-IV-I-V-I



This transformation of a simple harmonic progression retains the original's well-known voice-leading contour, as well as its sense of cadence, while at the same time sounding completely neoteric. This is a fairly remarkable phenomenon that allows composers to use techniques already on their musical palettes (i.e. the rules and functions of tonality), which are ingrained in every musician from an early age. This topic will be discussed further in the following chapter.

Neo-Riemannian Theory is a method for devising the most efficient path between two chords; it is most commonly used reductively in musical analysis, but it can also be useful for composers. Instead of just smearing a texture with random microtones, achieving nothing more than an accidental, out-of-tune color, a composer could, following these model concepts, create a path from chord to chord that makes linear sense: a path that has musical direction. It is all too easy and common for composers to use microtones as an exoticism, throwing them in here and there to color a particular moment, but this does not fully exploit the musical potential of microtones. These neo-Riemannian compressions provide at least a glimpse into the linear and tonal capabilities of microtones. Perhaps applying compressions to existing music (see Chapter 5) can further advance our appreciation of this potential.

CHAPTER 5

MICRO-TONALITY

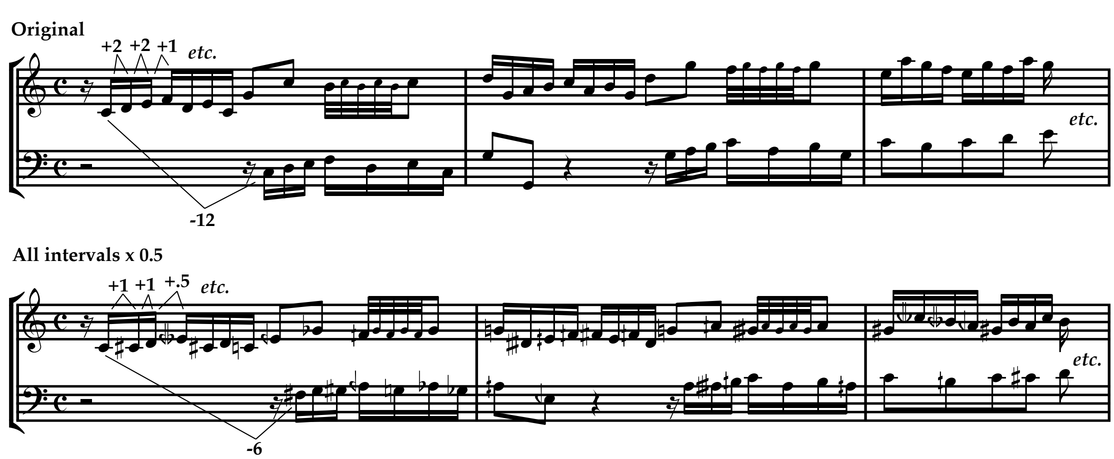
Micro-Counterpoint

Through experimentation with neo-Riemannian Theory, and simple harmonic progressions, we have discovered that basic tonal movements and functions can be applied to QT music. These produce perceivable (and musical) microtonal motion on the linear plane, at least when applied to simple triads. Now it is time to see what happens when QTs are introduced into a more complex linear environment, one where contrapuntal motion constitutes the main texture.

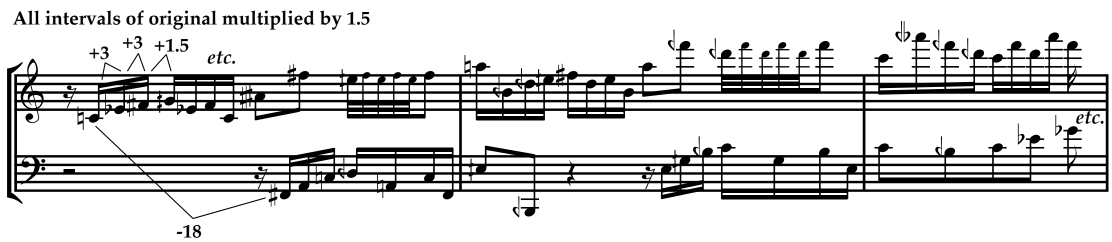
J.S. Bach's first Two-Part Invention in C major is a piece that most pianists learn in their formative years. Its imitative counterpoint is well known, most everyone has heard it, and it is fairly easy to play. Thus, it should, when transformed by microtonality, provide a familiar contour of counterpoint for the ear, and a physical pattern that nicely fits the hands.

Microtonally transforming this piece is an experiment only; such a process is not recommended as a compositional tool, nor is it thought to create "good," or "listenable" music. This experiment demonstrates only that contrapuntal contour, intervallic identity, and motivic imitation can be maintained and perceived in a QT context: it will probably not produce an altogether pleasing musical result. Instead of concentrating on how different this QT version sounds from the original ET version, one should focus on whether or not aspects of voice leading, counterpoint, and harmonic progression remain intact, given the particular QT handicap of this experiment.

In transforming this invention, there are two options: 1) keep the octave displacement between hands, multiplying only horizontal intervals, or 2) multiply both vertical and horizontal intervals. Option 1 ensures consonant cadences (on the octave). Since there is much imitation at the octave in this little piece, option 1 also makes motive recognition a bit easier. Option 2, on the other hand, cadences on, and imitates at, the tritone, which muddies the waters considerably. However, Option 2 is the easier one to reproduce. If one assigns the value of QT to each key on a keyboard, and simply plays the notes from the original score, Option 2 results. To produce Option 1 on the same keyboard, one would need to transpose a hand up or down a tritone. For ease on the part of those trying this experiment, Option 2 will be provided here. The following example represents what one hears while playing Bach's Invention in C (from the original score) on a QT keyboard:

Example 5.1 – Bach: Two-Part Invention - 0.5 Compression (excerpt)

Here is an excerpt of the same piece transformed by a 1.5 multiplication, instead of a 0.5 multiplication. To produce this version on a keyboard, while reading from the original score, one should simply assign each key to play back an interval a halftone and a half wide:

Example 5.2 – Bach: Two-Part Invention - 1.5 Compression (excerpt)

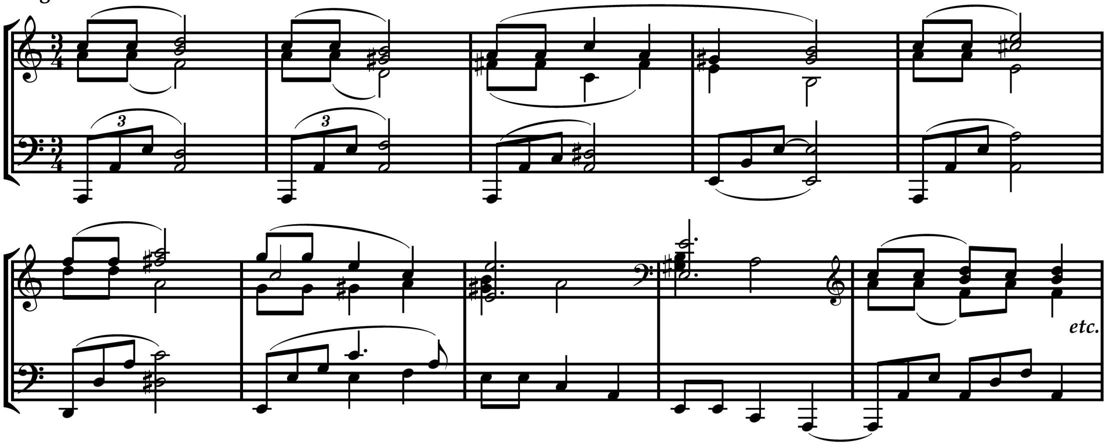
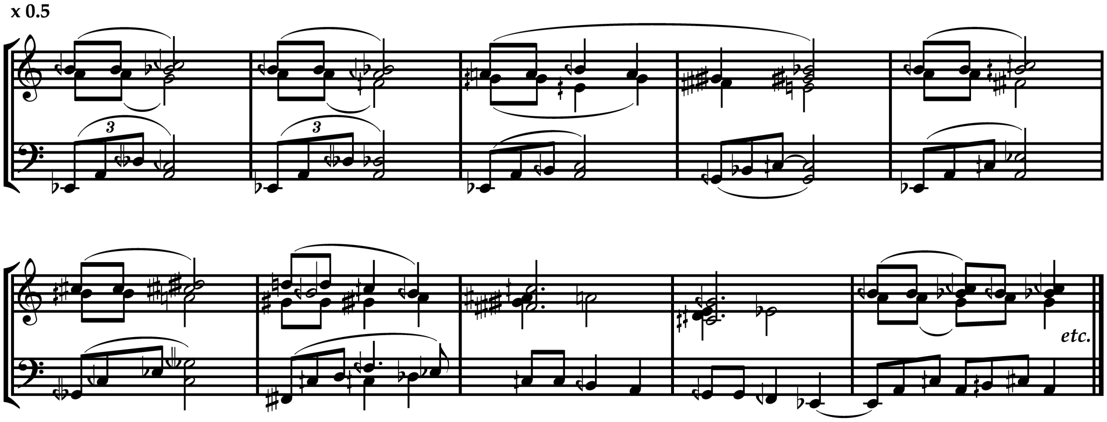


It is remarkable that all aspects of the original ET Invention, minus the tonal aspects, remain intact in these QT versions. The sound is quite foreign due to the novelty of QTs on the ear, but one can still rather easily discern the short melodic contours, the imitative counterpoint, the cadence points, and, most importantly, the flow of voice leading, and harmony. Though not as easy to hear in the QT version—due again to the novelty of the sound world—harmonic progression is definitely present, and harmonic shifts correlate with Bach's tonal modulations further along in the piece. As we can see (or rather hear), the QT version possesses the same attributes as the ET version; the only difference is that the ringing, more consonant intervals of ET are replaced with rapidly beating QT intervals, which can at first be distracting. Once the ear is accustomed to these harmonies, however, the more remarkable the similarities between the two versions become.

This Bach transformation shows that two-part counterpoint can be successful in a QT context, but will this remain true as the counterpoint becomes more dense, with three or four voices? One need only play through Bach four-part fugues on the same QT keyboard to reach a conclusion.

Now let's turn to a 0.5 multiplication of a Brahms Intermezzo (Op. 116, No. 2). Here the texture is mixed, some counterpoint, some melody over chords. All the voices retain their independence and the harmony progresses in such a natural way that one almost forgets there are QTs in play. If given this music unawares, it is doubtful that a listener would ever guess the involvement of Brahms in its composition, but a Brahmsian elegance and grace does remain, and is surprisingly evident from the start:

Example 5.3 – Brahms: Intermezzo - 0.5 Compression (excerpt)

Original

x 0.5

This piece is particularly beautiful, in both ET and QT versions, and demonstrates how completely and effectively the rules of voice leading and harmony transfer to the microtonal domain. These subtly shifting chords demonstrate the rich results of microtonal pitch multiplication. In recent theory, much emphasis has been placed on microtones as part of vertical harmony, especially in spectral music; it is hoped that these particular examples will help emphasize the oft-neglected linear potential they hold, in addition to the vertical.

CHAPTER 6

MICRO-SERIALISM

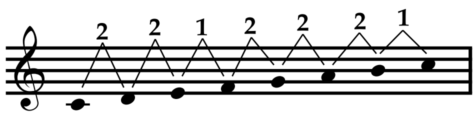
Micro Serial Operations

The goal of this study is to supply composers who are interested in microtonal music with a composition method that flows naturally from techniques already in their toolkit. So far, I have divulged my personal approaches to microtonality in the context of pitch fields/harmonic spaces, SYM intervals, interval expansion/contraction, and tonality. The next two chapters are devoted to techniques I have found particularly useful while exploring QT composition, techniques that originate from skills already finely tuned for most composers—namely serial procedures, and Messiaen's modes of limited transposition.[46]

Twelve-tone techniques have permeated the compositional landscape perhaps more than any other single theoretical invention, at least since the advent of tonal functions. I'm certain Schoenberg would be pleased with how widely his compositional approach has spread over the decades. Of course, post-tonal theory is a topic that could fill volume upon volume without exhausting its contents, so not every corner of this vast field will be explored here. The paragraphs below simply delineate my particular method—there could of course be others—for applying serialism to microtonality, in an effort to make clear how these same concepts can/could be applied to any branch of serialism.

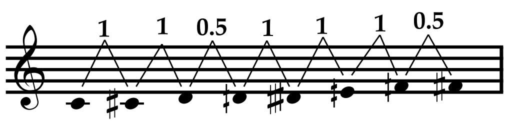
[46] For discussion of Messiaen's modes see Chapter 7.

Example 6.1 – Major Scale Intervals



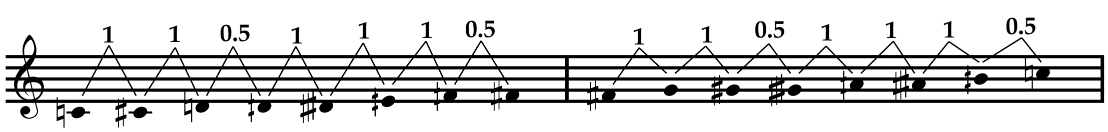
As shown above (in Ex. 6.1), scales can be thought of as a line of successive interval classes: in the case of a major scale, 2,2,1,2,2,2,1. If one were to compress this pattern into QTs, the IC line would be 1,1,0.5,1,1,1,0.5, as shown here:

Example 6.2 – Compressed Major Scale



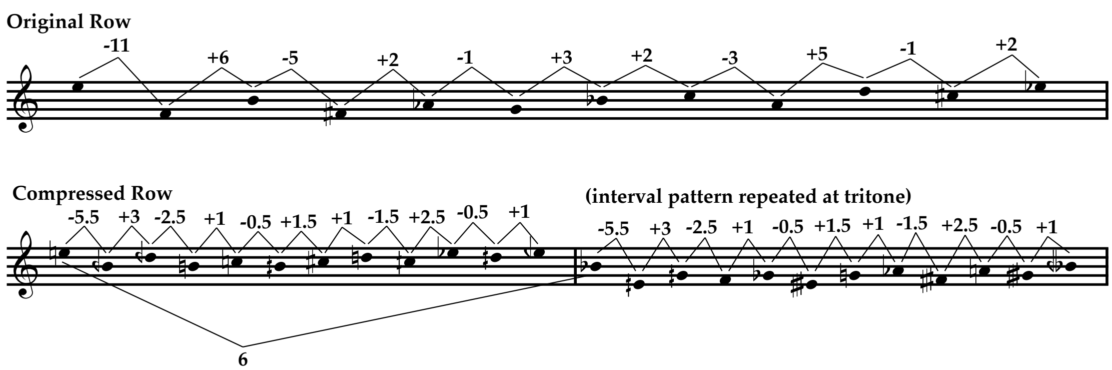
However, this compressed pattern only gives pitches within the lower half of the octave. It all fits into the interval of a fourth and a QT, i.e. 5.5. What does one do to fill in the rest of the octave? Conveniently, the whole pattern can actually be repeated starting at the tritone.

Example 6.3 – Compressed Major Scale Repeated at the Tritone



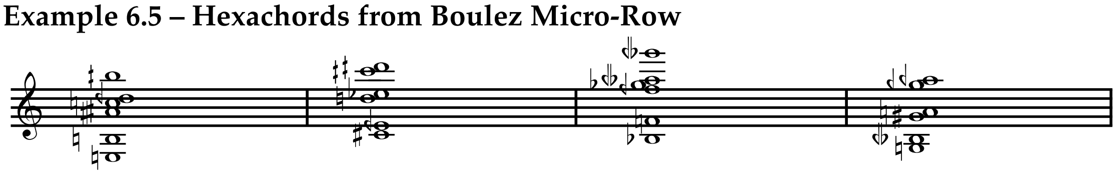
This is a universal rule concerning QT compressions: any ET scale or group of pitches will shrink to fit within a fourth plus a QT, leaving exactly enough room for the same combination of pitches to be repeated at the tritone transposition (t6). Any combination of pitches from 2 to 12, by means of a 0.5 interval multiplication, can be compressed to fit, twice over, into the space of an octave. Here is a 12-note row from Boulez's Third Piano Sonata,[47] and below it is the compressed version, doubled over at the tritone.

Example 6.4 – Boulez Row



This produces all twenty-four QT pitch classes, and maintains the shape and intervallic unity of the original row. All the operations performed in serial music are now available to microtonal composers. For instance, here is the row partitioned into adjacent hexachords:

Example 6.5 – Hexachords from Boulez Micro-Row

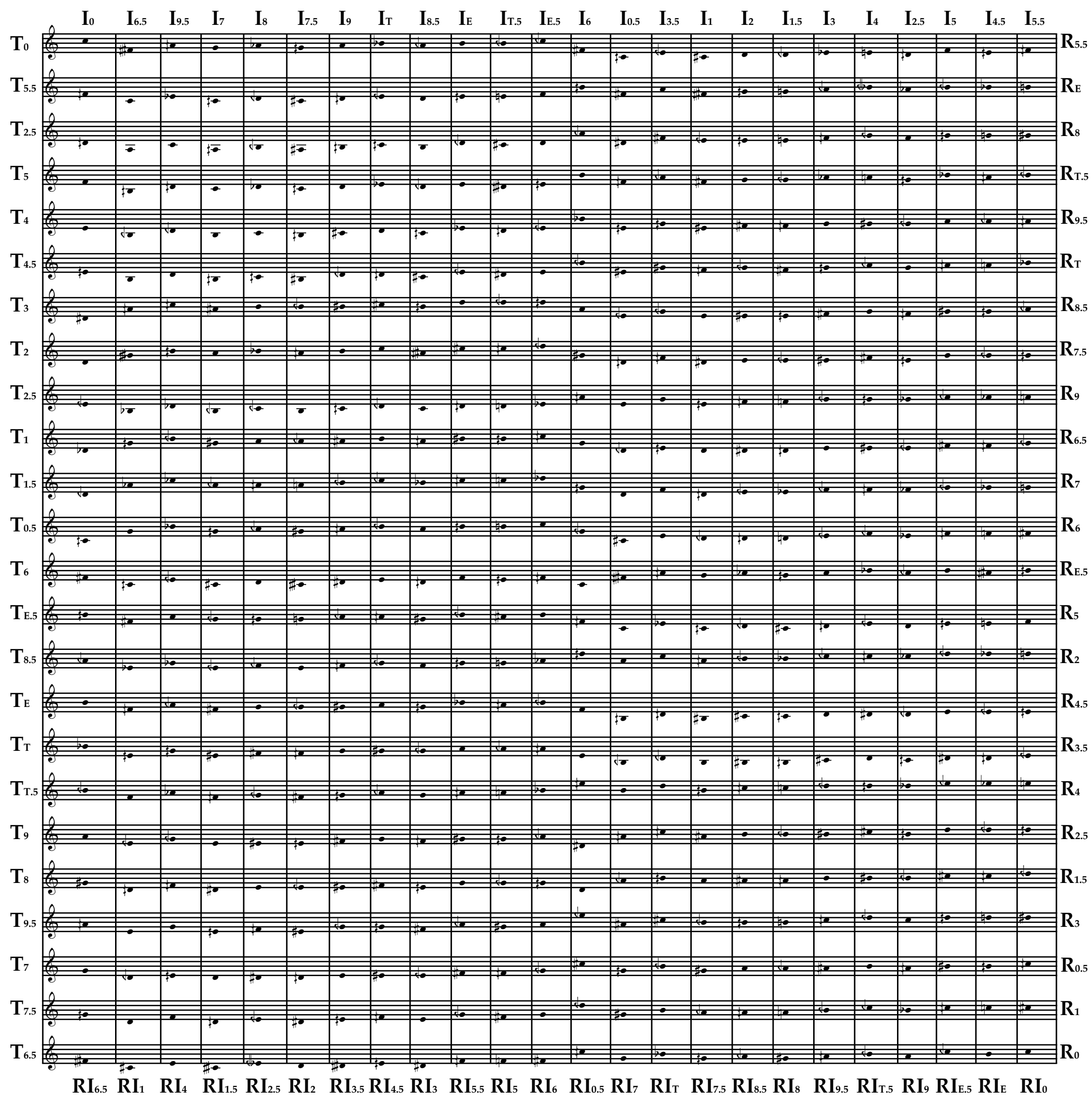


One wonderful aspect of this is that now, with twice as many pitches at hand, all the serial operations go twice as far. Instead of only two adjacent hexachords, now the composer has four, and instead of three adjacent

[47] Jameux, *Pierre Boulez*, 302.

tetrachords, there are now six. There are also twice as many options when it comes to transpositions, inversions, retrogrades, etc., and any symmetry within an ET row—such as Z-related or combinatorial sets—is always twofold in its QT equivalent. Simply put, all serial techniques, principles, and functions present in ET rows go twice as far in their QT versions. Here is a 24-note matrix of the QT Boulez row, as an example:

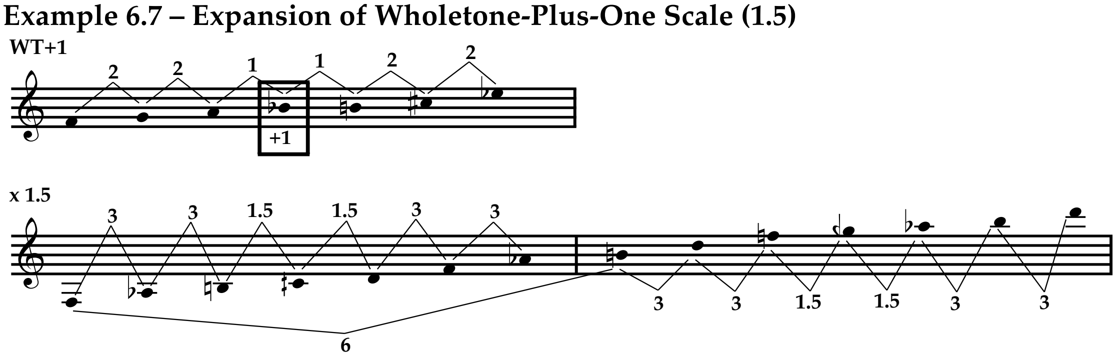
Example 6.6 – 24-note Matrix



This mammoth plexus of information provides us with every potential use and quality of the row, from different forms, transpositions, and inversions (etc.), to similarities/differences among them. The original ET version, for instance, has many intervallic similarities already, especially in three-note chromatic cells, and the QT version doubles these unities.

Of course, one need not always have all 24 pitches in every microtonal row. Nor is 0.5 the only option for QT multiplications. If one wanted to perform serial operations on a 7-note collection, say, for ease of demonstration, on the wholetone-plus-one collection,[48] and wanted for sake of spatial clarity to have larger intervals, one need only multiply by 1.5, 2.5, or 3.5 (etc.). These would be expansions, rather than compressions, but the same rules apply. The .5 ensures that the ET pitches will map onto a QT grid, just as a .33 would ensure a sixthtone grid. The integer controls the overall relative size of each interval. Here is a 1.5 expansion of the wholetone-plus-one collection, again replicated at the tritone:

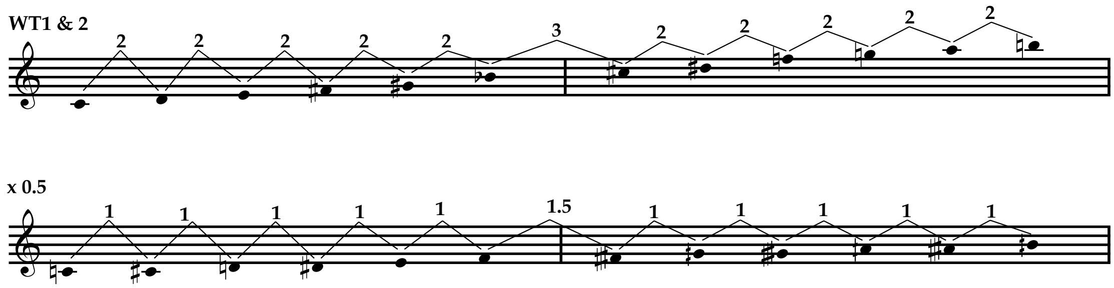
Example 6.7 – Expansion of Wholetone-Plus-One Scale (1.5)



[48] As suggested by its name, the wholetone-plus-one collection consists simply of the wholetone scale and one other pitch. As the wholetone scale is perfectly symmetrical, it doesn't matter which pitch is added; any added pitch produces the same interval vector.

But replicating an interval sequence at the tritone is only one way of filling out the octave. Borrowing an idea from Wyschnegradsky's *echelles*, one could fashion a scale (or series of intervals) by compressing a space that took two octaves to replicate its pitches, thus forming a single (non repeating) microtonal sequence within the octave. A simple illustration of this is again the wholetone scale. Example 6.8 places the two transpositions of the wholetone scale on top of each other, forming a 12-note chord. The chord's adjacent intervals are then multiplied by 0.5, which compresses the original into the space of an octave:

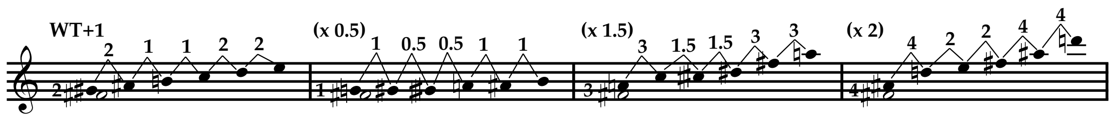
Example 6.8 – Contraction of Stacked Wholetone Scales



This technique can be used with any group of pitches that repeat every two octaves.

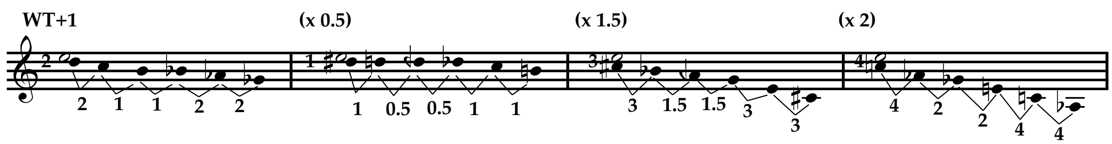
Concerning harmony, microtonal expansion and contraction can be a very useful tool: it can aid a composer in finding new harmonies, and in shifting between chords in a unified and meaningful manner. In the following example, gradual harmonic movement is achieved by the successive application of greater pitch multiplications, i.e., 1.5, 2, and 2.5. These multiplications are here executed from the lowest pitch of one of the wholetone-plus-one collections:

Example 6.9 – Wholetone-Plus-One Multiplications from Bottom Pitch



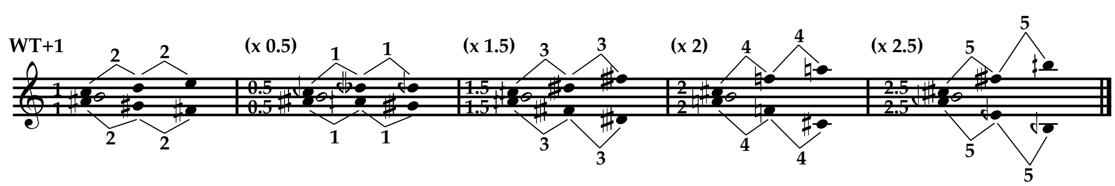
One could just as easily carry out these operations from the top pitch:

Example 6.10 – WT+1 Multiplications from Top Pitch



One could also create chords by performing interval multiplications from the middle outward. For instance, in the following example, contractions and expansions are made from a central axis pitch (B natural) of a wholetone-plus-one set:

Example 6.11 – WT+1 Multiplications Outward from Axis Pitch



This is very similar to the compression and expansion of Jonathan Harvey's symmetrical UR Spaces, discussed in Chapter 3.

If one were to make smaller compressions into sixthtone, which divides the octave into 36 equal parts via a 0.33 multiplication, all aspects of these serial operations could be tripled; quadrupled in eighthtone. However, as intervals get smaller and smaller, closer and closer together, the topic of pitch density becomes an issue. Can one still perceive and identify a continuity of intervals when there are 12 pitch increments within every major third, as is the case in sixthtone? It is difficult enough to recognize intervallic integrity when there are only 12 increments per octave. And wouldn't these difficulties in perception be exacerbated exponentially by the addition of one or more contrapuntal line? The smaller the division of the octave, the easier it is for simultaneous lines to blur into a larger texture, morphing into what Ligeti called "micropolyphony,"[49] which effectively negates the independence of each line. However, as demonstrated in figures 5.2 and 5.3 (the compressed Bach and Brahms examples), QT counterpoint is discernable in both two- and three-part writing: one can hear the recurrence of intervals, motives, imitations, the flow of stepwise voice leading, and the closure of cadence points in much the same way as in the originals. Perhaps these elements will be equally perceivable in smaller octave divisions, but that experiment will be left for others to pursue.

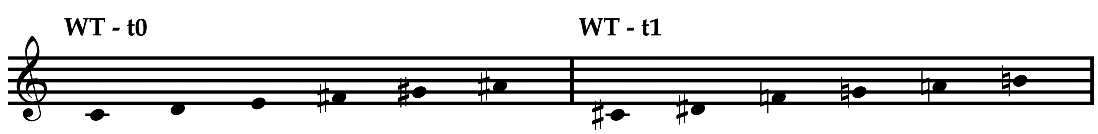
[49] Steinitz, *Music of the Imagination*, 103–104.

CHAPTER 7

MICRO-MODES

Modes à transpositions limitées

In his 1944 treatise, *Technique de mon langage musical,* French composer Olivier Messiaen revealed his now famous "modes of limited transposition," an idiosyncratic harmonic system which he used throughout his long and prolific career. In the pages of the treatise, Messiaen describes these modes as possessing particular "charm[s] of impossibilities," where only a restricted number of transpositions can be achieved before the original is replicated.[50] The easiest demonstration of this is the wholetone scale, which Messiaen labels Mode I. This mode is the most "limited," in that it has only two transpositions, t0 and t1, as shown here:

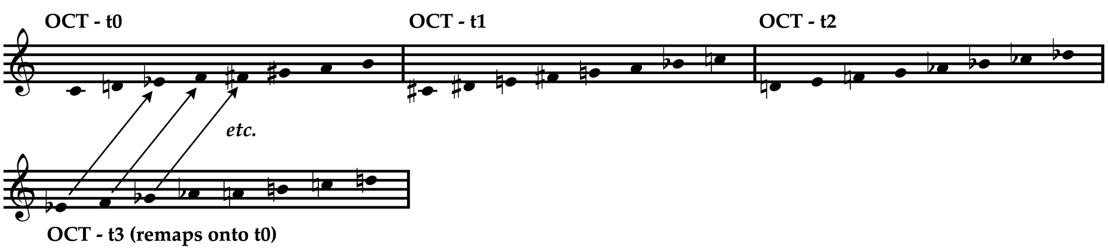
Example 7.1 – Mode I & Transposition

One can see that t3, starting on "D," would replicate exactly the pitches of t0. By his own admission, Messiaen rarely employed this mode on its own, out of respect for its remarkable use in the music of Debussy and Ravel.[51] However,

[50] Messiaen, *Technique de mon langage musicale*, 51.
[51] Ibid., 52

it is embedded in others of his modes, and is very often used when obscured in this fashion.

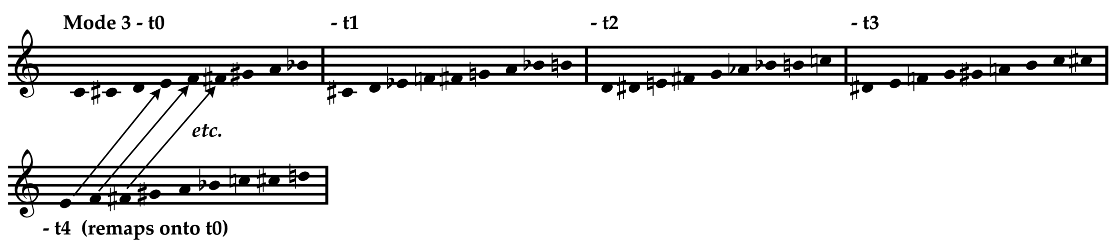
Messiaen's second mode is the octatonic scale, which can be transposed three times before mapping onto itself.

Example 7.2 – Mode II & Transpositions



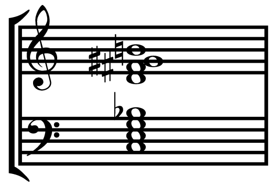
Messiaen was especially drawn to this mode because it possesses strong links to well-established tonal elements; indeed, each transposition possesses four major and minor triads, each separated by a minor third, and extensions such as dominant sevenths and sharp elevenths, as well as Messiaen's beloved major sixth, can be added to each. Also present in this mode are two fully diminished seventh chords, which, when played simultaneously, constitute all eight pitches of the scale. This mode, and others, can be subjected to QT manipulation, proving equally attractive as a novel compositional resource, just as the original version did to Messiaen.

Mode III is a nine-note symmetrical scale that consists of two adjacent halftones separated by a wholetone. In other words, its interval sequence is 1,1,2,1,1,2,1,1,2. Messiaen used this mode at least as frequently as Mode II, possibly more, and often combined the two modes to create harmonic variety and/or ambiguity. Mode III can be transposed four times before duplicating itself, and, like Mode II, each transposition has within it a vast stock of tonal elements: six major and minor chords, each with attachable major and minor sevenths and sixths, and three different augmented and diminished triads. Each transposition also contains two (of four available) transpositions of the hexatonic scale, which is itself a limited transposition mode that Messiaen did not include in his treatise. Here is Mode III, and its four transpositions:

Example 7.3 – Mode III & Transpositions

The wholetone scale is also imbedded within Mode III, and constitutes the most common context for Messiaen's use of it. Also worth mentioning is Mode III's close relationship to Messiaen's *accord de resonance,*[52] which is derived from the overtone series.

[52] Messiaen, *Technique de mon langage musicale*, 43.

Example 7.4 – Chord of Resonance



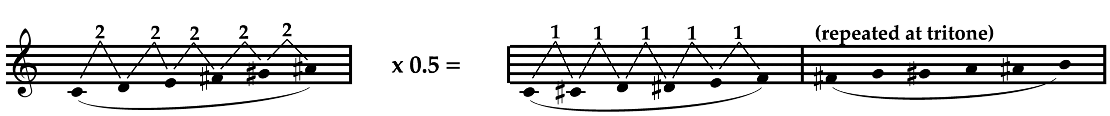
All but one PC of Mode III (E♭ in t0) is contained in this chord, which makes it possible for a composer to transition seamlessly between modal and spectral writing, especially since that E♭ does occur a bit higher up in the harmonic series.

Messiaen's fourth through seventh modes are equally intriguing, but were much less frequently used in his music. Since Modes I through III will sufficiently demonstrate the potential of our microtonal applications, the last four modes will not be discussed here.

Micro Modes of Limited Transposition

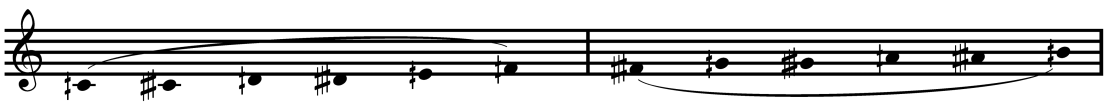
Mode I, the wholetone scale, is a bit limited as a microtonal resource, but putting it through the expansion process is informative. As shown in the following example, a 0.5 multiplication results in a commonplace chromatic scale:

Example 7.5 – Mode I to Chromatic



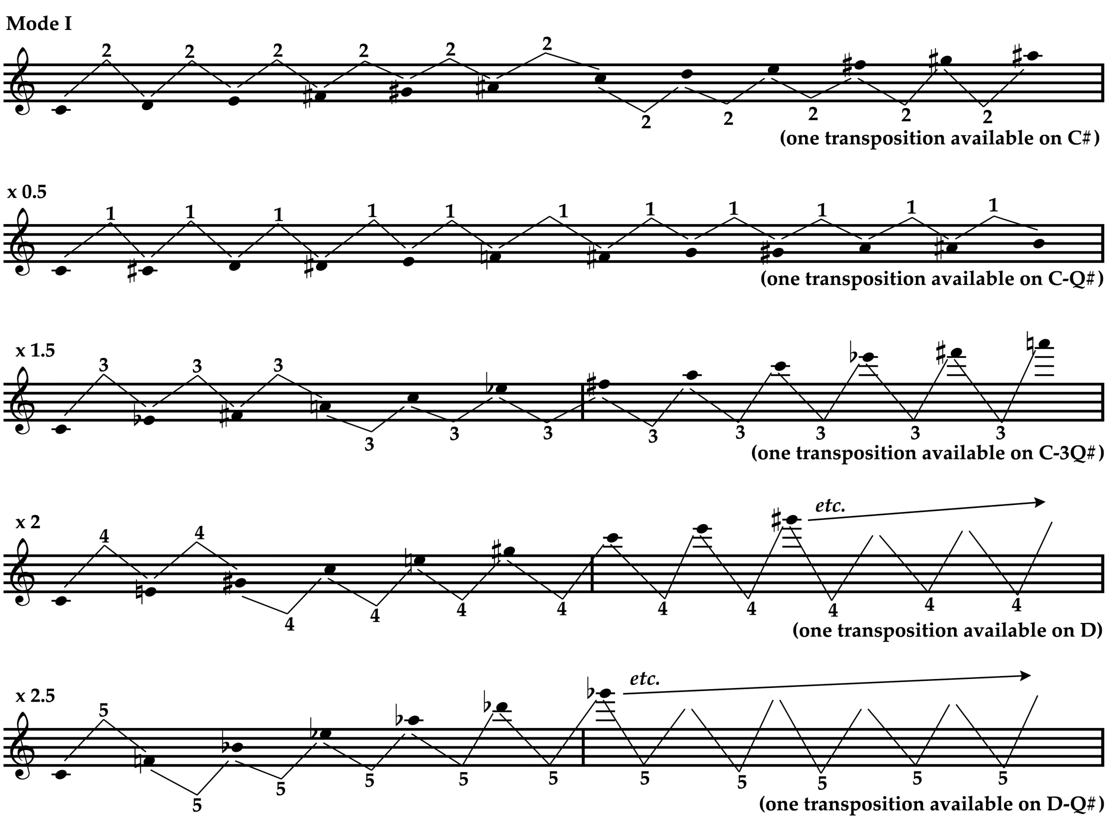
This transformation does retain a second transposition, a chromatic scale of QTs:

Example 7.6 – Micro Mode I Transposition



Below are some QT multiplications and possible transpositions for Mode I; each results in symmetrical ET expansions, illustrating that all perfectly symmetrical interval spaces are related by multiplication:

Example 7.7 – Multiplications of Mode I

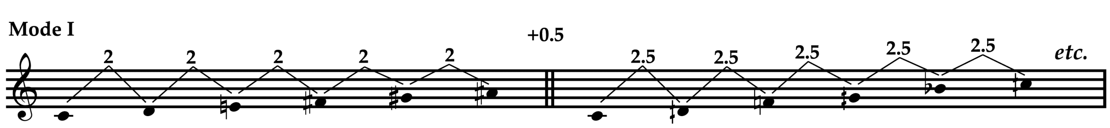


N.B. Following each transposition's particular interval size, expansions still retain only one possible transposition. 0.5 compressions indicate that a QT is the smallest possible interval in both the multiplication and the transposition, just as a multiplication by 1 would indicate the halftone as the smallest possible interval. Accordingly, one must keep in mind that multiplications by 1.5, 2, 2.5, and the like, retain those same intervals for transposition levels.

In general, Mode I is less appealing than its counterparts; it segregates ET and QT versions in its transpositions, and tends to sound out-of-tune without the mixture of both. Music that alternates between these two transpositions sounds like ET at 440 and ET at 453, and no special quality of timbre or tuning results. As mentioned earlier, Messiaen didn't feel comfortable using Mode I in ET. Perhaps the same qualities that caused his discomfort transfer directly into microtonal realms, as well.

There is one technique, however, that proves useful here: the concept of pitch addition. If one simply adds .5 to the width of each interval in Mode I, the following scale results:

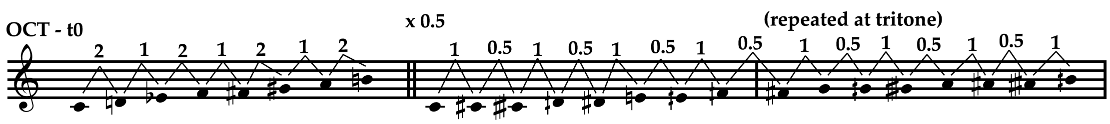
Example 7.8 – 0.5 Addition of Mode I



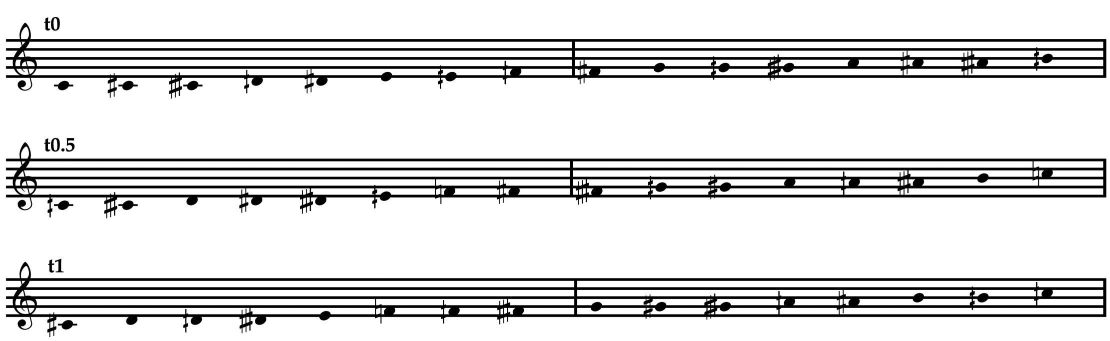
In the case of Mode I, this beautiful chain of SYM fourths (which is an exact replica of a Wyschnegradsky *eschelle non octaviante*) can be achieved otherwise by a 2.5 multiplication of the chromatic scale. However, with less uniformly symmetrical modes, such pitch addition can produce results not possible with multiplication.

Mode II is one of the most commonly used scales in 20th- and 21st-century composition. Its particular ET symmetries are very attractive and prove no less so when converted to the microtonal domain. Here is Mode II, followed by its 0.5 contraction:

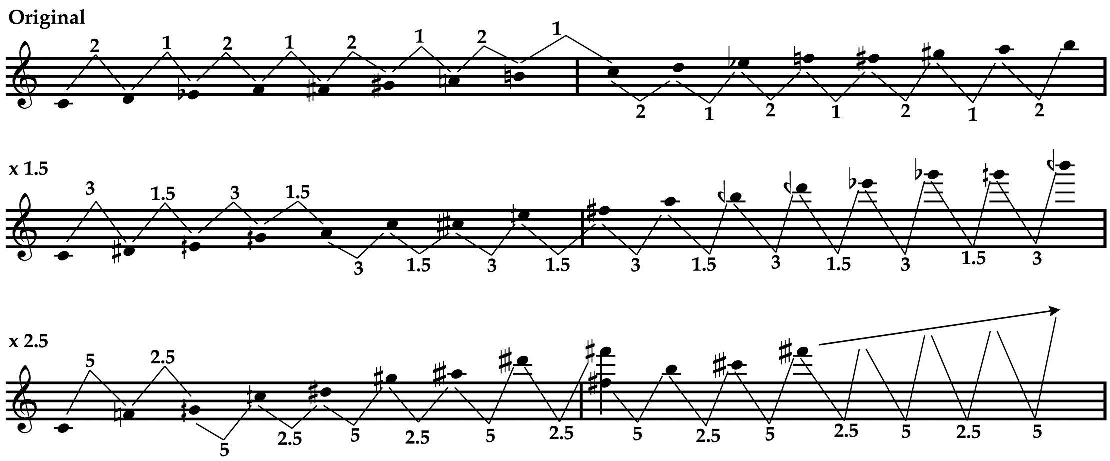
Example 7.9 – 0.5 Multiplication of Mode II



As in the original ET version, micro Mode II still has only three transpositions. Here they are:

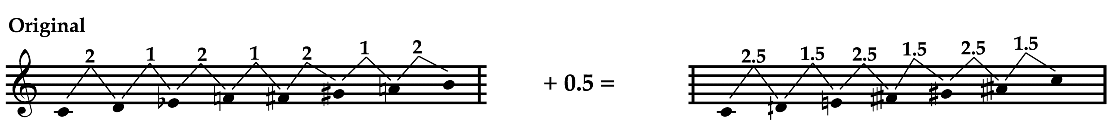
Example 7.10 – Transpositions of Micro Mode II

The specific number of possible transpositions for the ET modes holds true for every QT multiplication. In other words, Messiaen's "charm of impossibilities" remains intact, no matter the overall division. Here are 1.5 and 2.5 expansions:

Example 7.11 – Multiplications of Mode II



Also, as mentioned above, pitch addition, where a certain interval is simply added to existing intervals, can produce interesting and useful results. Adding .5 to the intervals of Mode II produces the following scale:

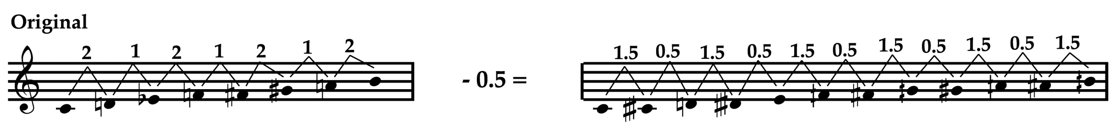
Example 7.12 – 0.5 Addition of Mode II



This arithmetic operation drastically changes the makeup of Mode II: it turns the original eight-note scale into a six-note scale, and warps the 2:1 interval ratio of the original to a 5:3 ratio. Accordingly, this new ratio alters the mode's number of unique transpositions from three to eight, creating in essence an entirely new microtonal mode.

The opposite operation, pitch subtraction, also produces interesting results:

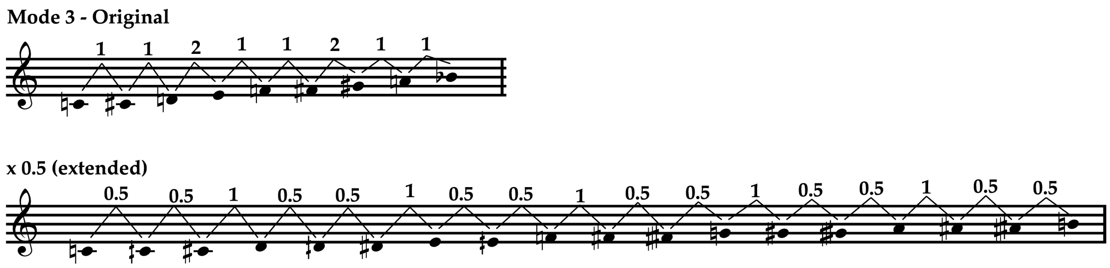
Example 7.13 – 0.5 Subtraction of Mode II



Again, this simple procedure has radically shifted the intervallic properties of Mode II: it has replaced the original eight pitches with twelve, and the ratio of symmetry has gone from 2:1 to 3:1. This new ratio has also increased the mode's number of unique transpositions from three to four: t0, t0.5, t1, and t1.5.

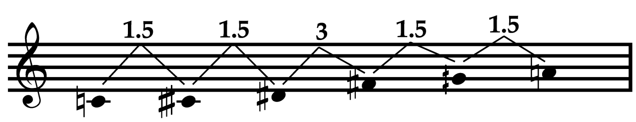
As mentioned above, **Mode III** has only four unique transpositions: t0, t1, t2, and t3. This holds true for the QT multiplications as well, and to discover their respective transposition levels, one can simply multiply the originals by the same multiplier. A 1.5 multiplication would thus have t0, t1.5, t3, and t4.5, because 1.5 is the smallest scalar increment in that new mode. The following examples delineate the new scales produced by multiplying Mode III intervals:

Example 7.14 – 0.5 Multiplication of Mode III



A 0.5 multiplication produces an 18-note scale with an interval chain of 0.5, 0.5, 1. This scale is interesting and potentially useful, but perhaps a bit too densely packed. A 1.5 multiplication creates a slightly larger interval size and fewer PCs than the original. Thus the listener doesn't have as many notes to process, and the interval size is more familiar, each step being only slightly larger than an ET halftone.

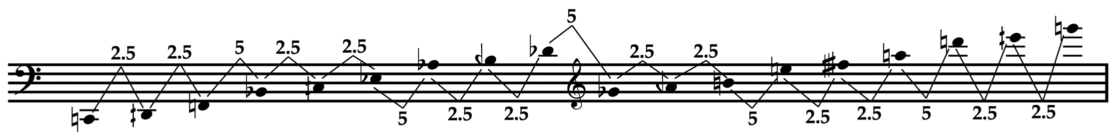
Example 7.15 – 1.5 Multiplication of Mode III



This new six-note scale rings very nicely due to its predominance of SYM thirds, which are present, as mentioned earlier, in the upper reaches of the harmonic series. Consequently, it has very little beating.

Conversely, the predominance of SYM fourths in a 2.5 multiplication (shown in example 7.16) produces an intense, shimmering effect.

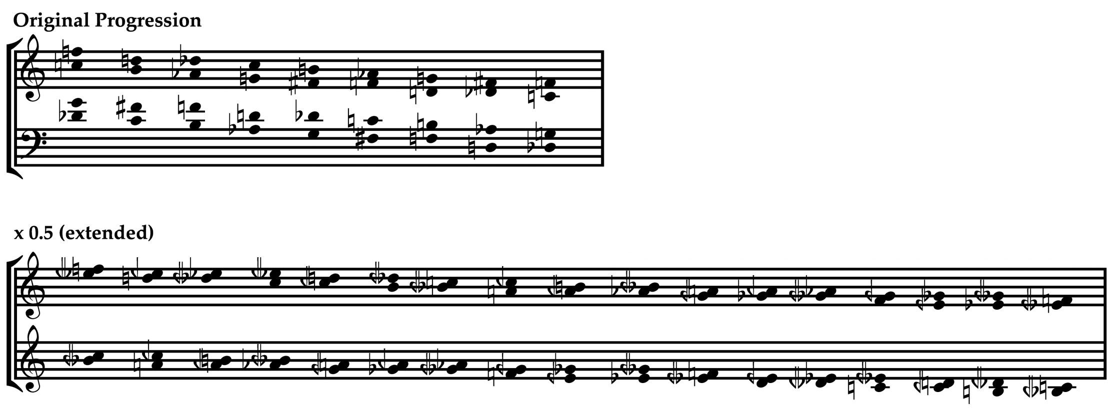
Example 7.16 – 2.5 Multiplication of Mode III

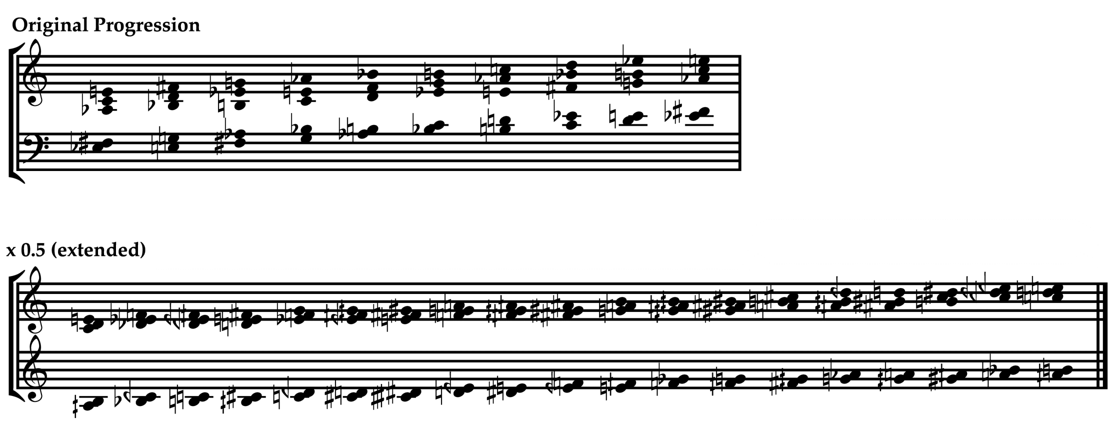


The interval size of this multiplication is so large that the new mode resembles a pitch field. There would be no problem viewing it as such, and perhaps doing so would lend desirable musical results. One can certainly imagine composers like Berio, Lutoslawski, or Carter exploiting this field's fixed registers while working their respective rhythmic techniques from within its confines.

By manipulating the interval content of Messiaen's modes into their QT equivalents, we have essentially created a treasure trove of new harmonic/melodic material from which to draw, and a system in which to create intervallic and formal unity. One need not treat these modes in the same way as Messiaen. One could extract tonal chords and create melodies based on their combinatorial pitches, or use partitioned chords from different transpositions to pace a formal/harmonic scheme. One could place the modes and transpositions in a series of chords that move statically over a related or unrelated drone, or simply use them as interval molds in which to fit the contour of existing ET parameters, much like the Bartók example discussed in Chapter 2. The potential uses of these modes are vast, and I invite interested composers to try their hand at writing with them.

One can think of myriad alternate approaches to Messiaen's techniques, but what would happen if one took Messiaen's own examples from *Technique* *de mon langage musical* and modeled them in a 0.5 multiplication? Messiaen had one of the most unique voices of all 20^{th}-century composers, so will a QT transformation still sound like it belongs to Messiaen's *langage*?[53] Here is one of Messiaen's original Mode IV progressions,[54] followed by its 0.5 multiplication:

Example 7.17 – 0.5 Multiplication of Messiaen's Mode IV Progression

The same multiplication of a Mode III progression:

Example 7.18 – 0.5 Multiplication of Messiaen's Mode III Progression

[53] To simulate this, one can simply play Messiaen's original examples on a QT keyboard.
[54] Messiaen's Mode IV is included in the Appendix (p. 83).

In each of these examples, for both Mode IV and III, one can hear the subtle intervallic shifts of each chord, and can hear the particular quality of the mode at large. However, what is most striking is that this music no longer sounds like Messiaen. There is no resemblance to the original whatsoever. This suggests that perhaps all the idiosyncratic techniques of a certain composer can be adopted and/or reappropriated in the context of microtonality. If, under the distorting lens of microtonality, Brahms no longer sounds like Brahms, and Messiaen no longer sounds like Messiaen, then the more monochrome, non-common practices of 20th-century composers will surely not resemble their respective styles either.

This is not to say that composers should start microtonally multiplying other composers' works and begin calling them their own, although under certain circumstances (perhaps in moments of allusion to other periods or aesthetics) such an approach would not be entirely inappropriate. Instead, this opens the doorway for those innumerable 20th-century techniques, which in other circumstances would too closely resemble the works of their originators (as often happens when composers try their hand at Messiaen's modes), to be employed in a way that is personal to each composer, without the risk of stylistic encroachment. Many theories of the 20th century can now be approached from a completely different angle, viewed from a new perspective. If one is open to composing with QTs, this thought should be extremely liberating.[55]

[55] If the reader wishes to compose with or further study Messiaen's remaining micro modes, or micro-hexatonic modes, a short compendium of useful micro pitch multiplications is included in the Appendix (p. 83).

CHAPTER 8

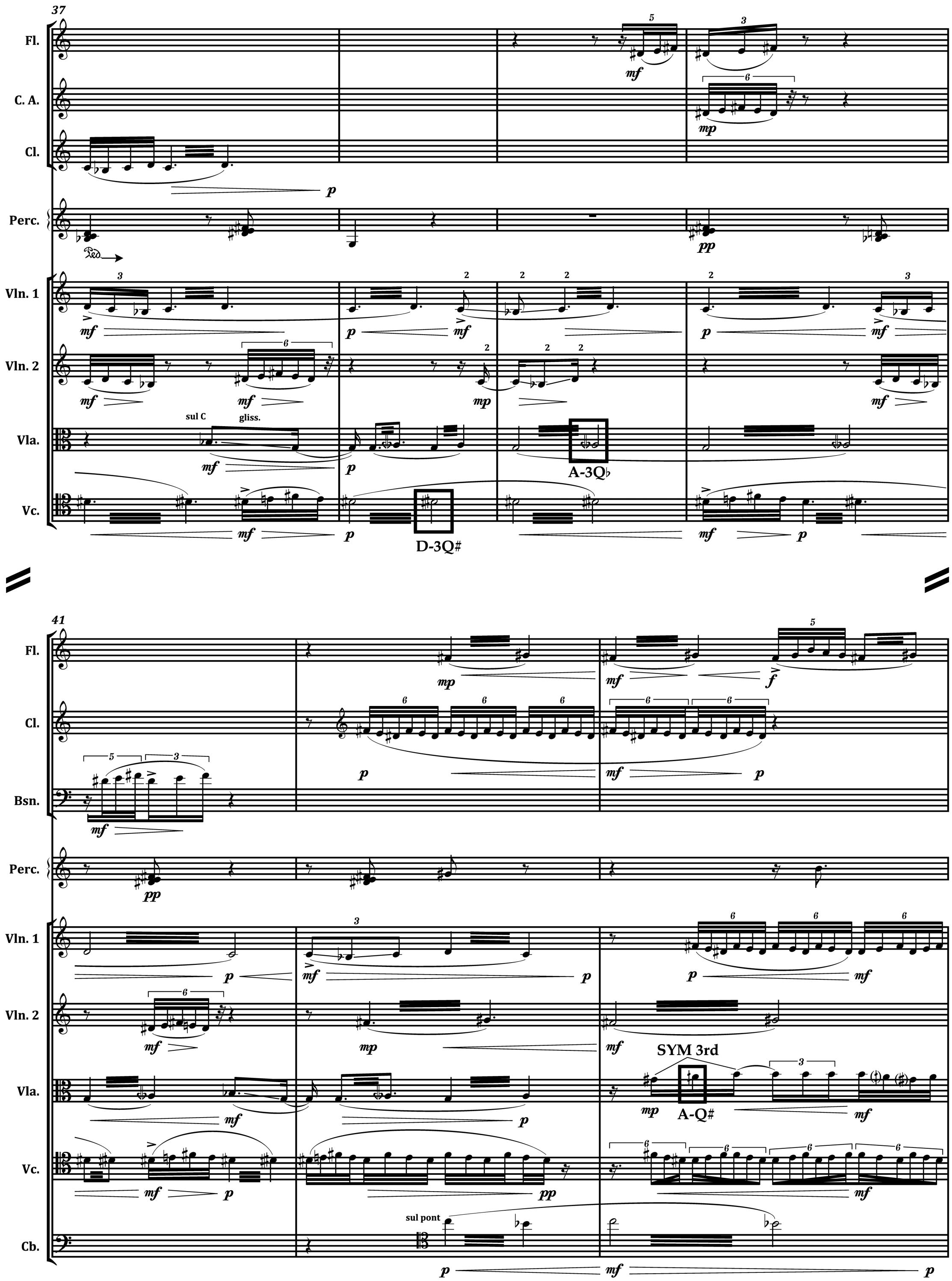
CONCLUSION

At the Easel

In my own music – the only source, of which I am aware, that explicitly uses the processes discussed in this treatise – I try to use these microtonal techniques carefully and often sparingly, as if each were a specific bright color on a painting palette. Their presence in a piece, even in small amounts, can drastically influence its character, narrative, and emotional impact, much like dabbing a splotch of red on a canvas of gray. In other words, I have learned that these techniques should not be used lightly. On the contrary, much thought should be invested into how and when they are used, because just a little dab of this particular color goes a long way.

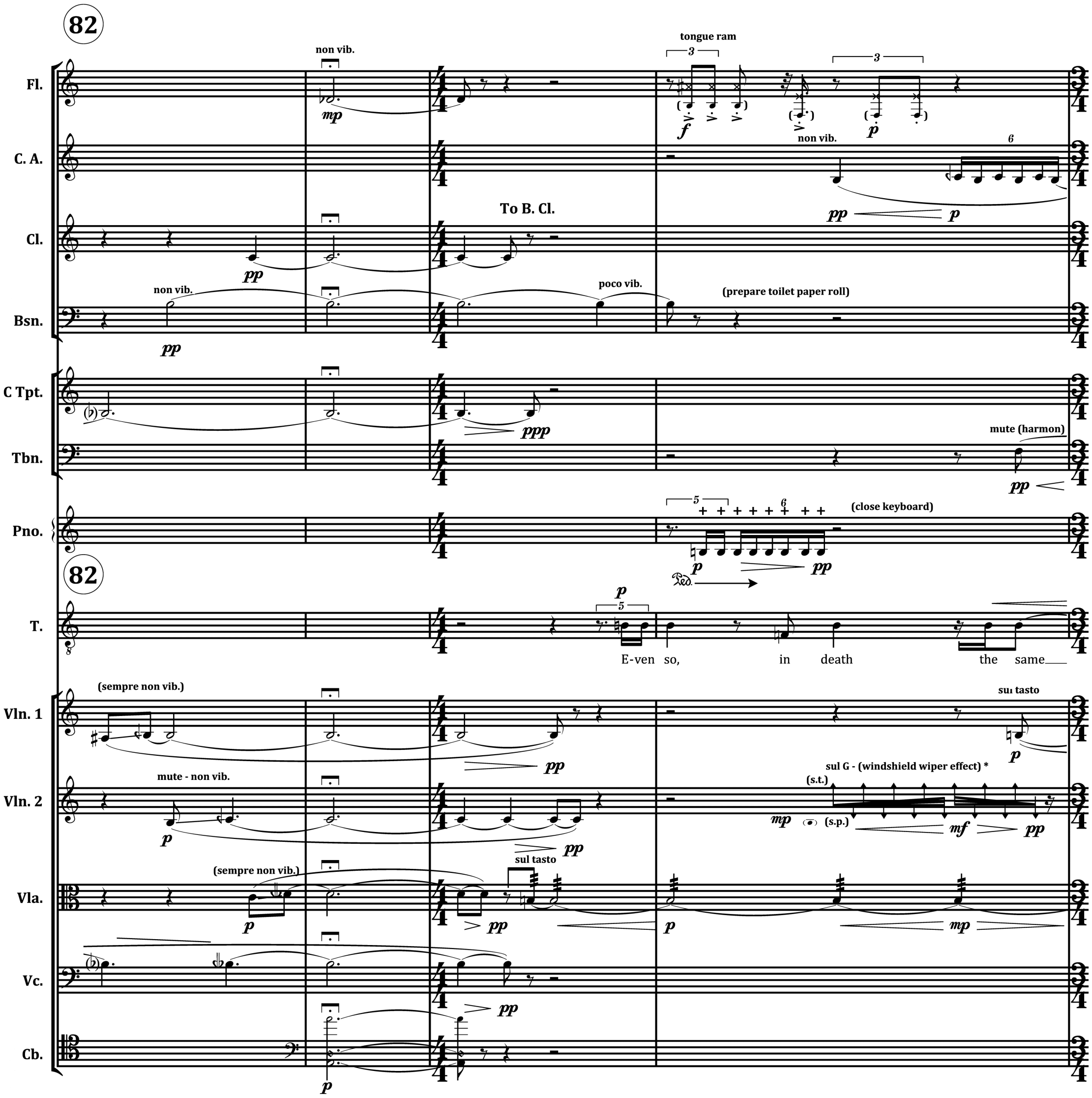
In my piece *Threshold*,[56] which is a nine-minute work for tenor soloist and sinfonietta, I employ QTs only to evoke certain sentiments at certain moments. For instance, I begin using subtle microtonal inflection in measure 38 to create a nebulous and unstable atmosphere, and in measures 43 and 45 the viola and violin begin arpeggiating SYM thirds to further this instability.

[56] A complete score of *Threshold* is provided in the portfolio portion (volume II) of this document.

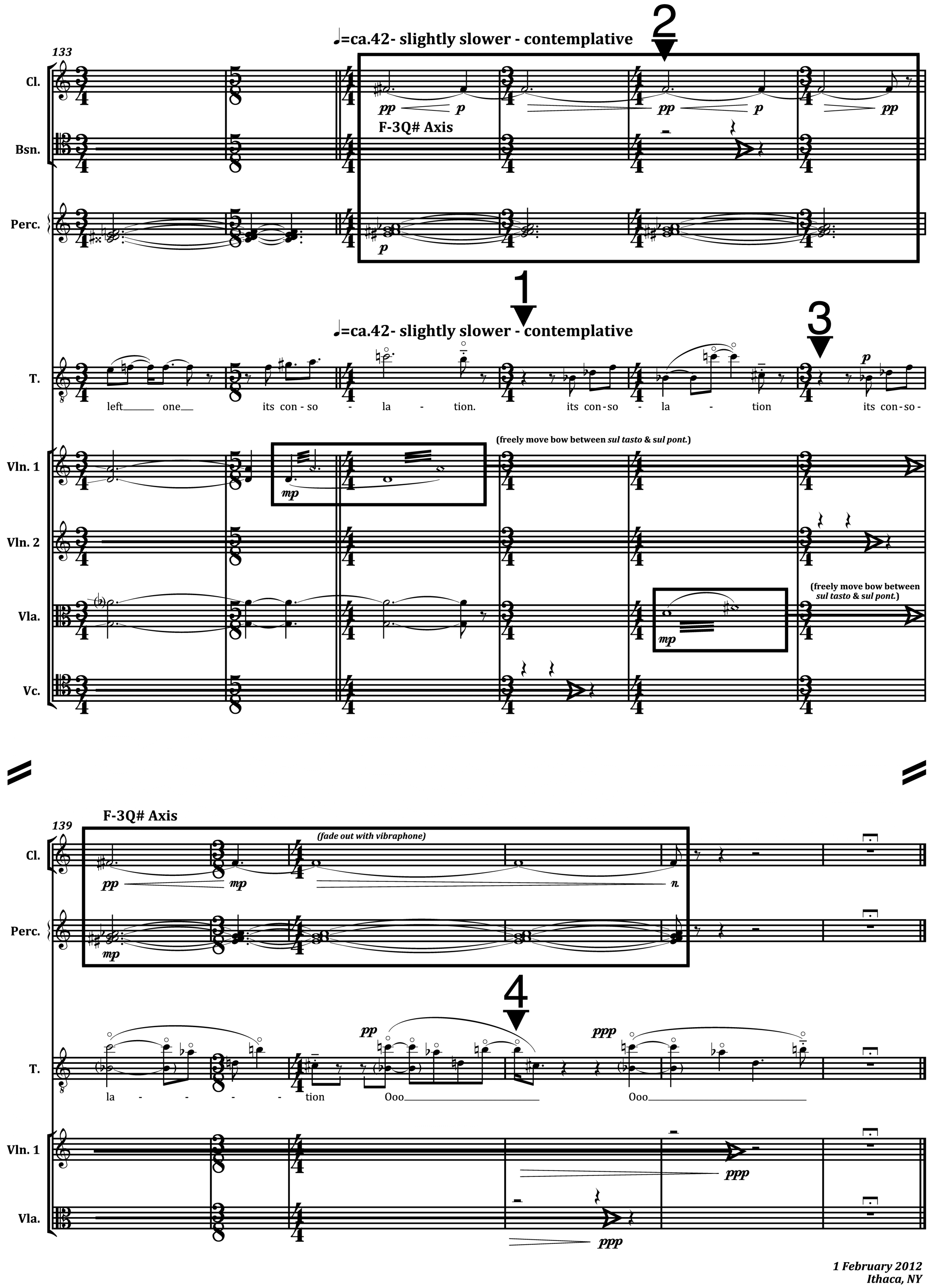
Example 8.1 – Jones: Threshold, mm. 38–43

Two measures before rehearsal 50 I remove the microtones to regain a more stable, equal-tempered, twelve-note space. All of this is in reference to the text,[57] which is rich with the image of a bud slowly blossoming as the light and warmth of day approaches. Here I use the uncertain quality of microtones to paint the emotional content of the text, after it has been sung.

I use a similar technique in measure 82, after the soloist longingly sings the word "mother." Here I paint with microtones a certain image on the metaphysical meaning of that word by saturating the space of a major third (A in the contrabass to D♭ in the flute) with QTs. This creates a somewhat bitter aftertaste to the word, as if the singer has a slightly pained, troubled, or blurred memory of his mother.

[57] The text to *Threshold* is a poem of the same name by Rabindranath Tagore (used with permission).

Example 8.2 – Jones: Threshold, mm. 82–85

Later in the piece, toward the end (m. 135), the singer starts repeating the word "consolation," in reference to a child finding its mother's breast. This is a special use of imagery on the poet's part, one that metaphorically describes a person's rebirth, after death, into the next life. As the composer, I felt this word (and its attached sentiment) called for a special musical backdrop, and so I added a single microtone at a central axis point (an F-3Q# in the clarinet amid four adjacent chromatic pitches in the vibraphone).

Example 8.3 – Jones: Threshold, ending



This creates an almost subliminal shimmer to the texture, due to the beating, and thus adds a depth of expression (or spiritual meaning, as Harvey might describe it) to an already moving text.

This summarizes my personal approach to composing with microtones thus far; I write in a mostly twelve-note, ET landscape, and use microtones as just one color or technique among many. Depending on what I am trying to express in a given piece, more or fewer microtonal techniques are used, and I have laid forth my personal methods on how I do this in the preceding chapters. I do not believe in strict adherence to any one school of thought, nor do I maintain that microtonality is the future of modern music. In this study, I am not advocating for a new QT school. In fact, as I do not believe in any stylistic partisanship, I am skeptical of schools in general. I am simply venturing that there is untapped potential in microtonal theory; potential that is both musical and easy to use. I view microtonality as one among many musical brush strokes that can be used at a composer's bidding, based most importantly on what he/she wishes to express. I believe this to be true regardless of a composer's stylistic and/or aesthetic proclivities, and the chapters here concerned with tonality especially reflect this belief.

This treatise provides a footing for work in other microtonal domains, such as sixthtone, eighthtone, and any other equal division of the octave. One can easily translate these techniques onto other models by changing the decimal to reflect the division of the halftone, such as 0.33 for three increments per halftone (equaling sixthtone), 0.25 for four increments per halftone (equaling eighthtone), or 0.2 for five increments per halftone (equaling tenthtone). The possibilities are endless, but one should be aware that there is no standard for notation,[58] and that the smaller increments become progressively more difficult for the listener to perceive, and more cumbersome for the composer to manipulate.

The techniques discussed in this study form an accessible microtonal methodology, for both the listener and the practitioner, one that draws on familiar procedures and practices to create uniformity, direction, and purpose in a composer's work. In short, this approach demonstrates that 1) we already have the tools for systematic microtonal writing at our disposal, and that 2) writing with these techniques can produce musical results. Through this method, every single musical technique throughout history is applicable to microtonality: those of medieval chant, Fuxian counterpoint, diatonic, chromatic, and modal harmony, interval cycling, transpositional inversion, combinatoriality, and all other serial procedures, to name only a few. These techniques could also be coupled with those of spectralism, and could even be joined with the just tuning systems of the American microtonalists. With these techniques, microtonal composers now have an even broader range of colors on their respective palettes, not to mention an appreciable potential for color mixture, shading, and nuance.

Returning to the analogy of the pool, mentioned in the opening chapter, my goal has been to learn to swim in microtonal waters, and to demonstrate some specific strokes that can help keep fellow swimmers afloat. With the QT techniques described in this treatise, techniques that transcend stylistic and

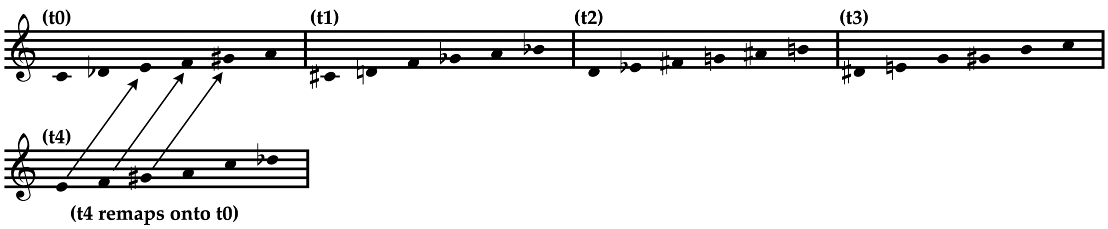
[58] Notation varies greatly from composer to composer, even for relatively simple QT symbols. A good place to look for study of these notations is the *Dictionnaire des musiques microtonales.*

aesthetic approach, a composer can learn to tread water, and can eventually develop a comfortable, personalized stride—a freestyle of sorts—that will allow for confident swimming. It all depends on how far the composer is willing to go. This is not to say that all the answers to microtonal inquiries are contained in these pages; this study is by no means comprehensive. But it does provide a looking glass through which one can see the musical (and functional) potential of microtones. It is my hope that this potential will inspire those interested to further explore, develop, and compose with the techniques discussed here, and that it will, in turn, provide a little moisture to the current drought in microtonal methodology.

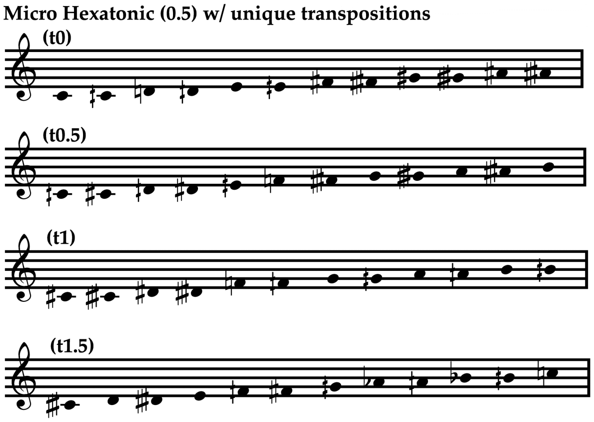
Additional Modes & Multiplications

Hexatonic:

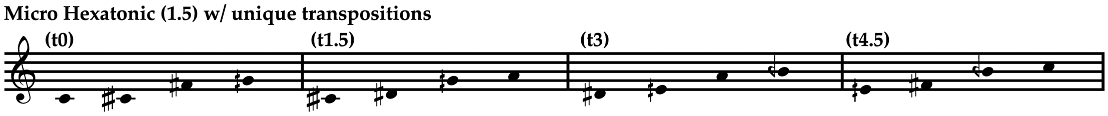
Hexatonic (ET)



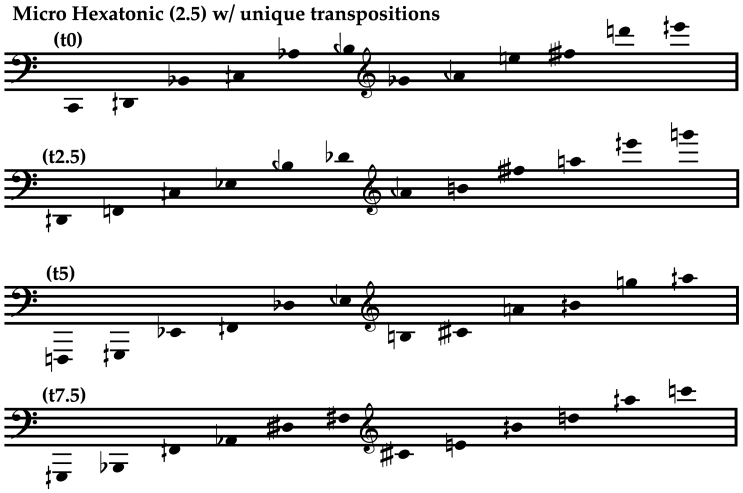
Micro Hexatonic (0.5) w/ unique transpositions



Micro Hexatonic (1.5) w/ unique transpositions

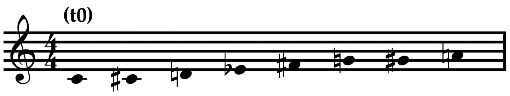


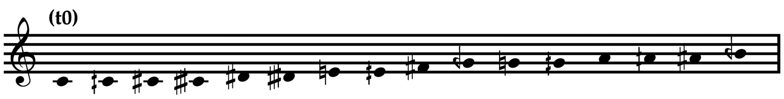
Micro Hexatonic (2.5) w/ unique transpositions



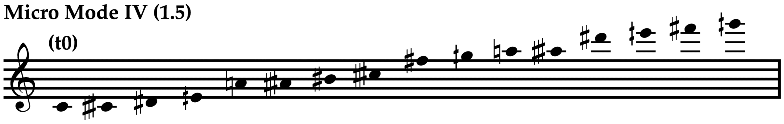
Additional Modes & Multiplications (cont.)

Messiaen Mode IV:

Messiaen Mode IV (ET)

(six unique transpositions available)

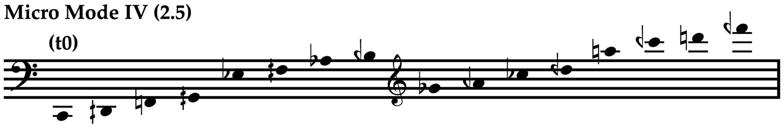
Micro Mode IV (0.5)

(retains six unique transpositions)

Micro Mode IV (1.5)



(retains 6 unique transpositions)

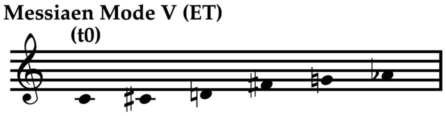
Micro Mode IV (2.5)



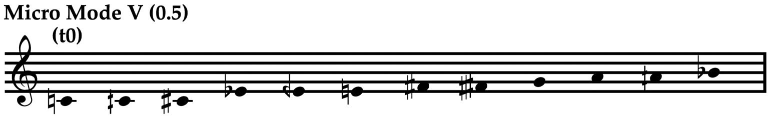
(retains 6 unique transpositions)

Messiaen Mode V:

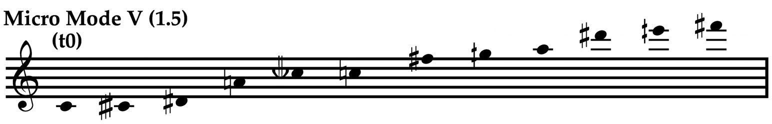
Messiaen Mode V (ET)



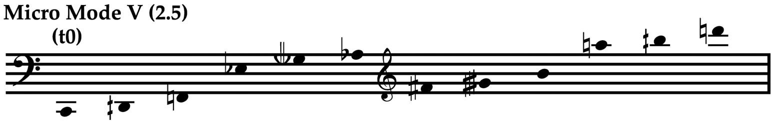
(six unique transpositions available)

Micro Mode V (0.5)

(retains six unique transpositions)

Micro Mode V (1.5)



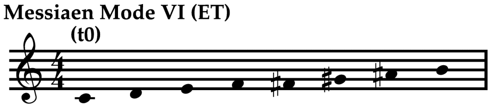
(retains six unique transpositions)

Micro Mode V (2.5)

(retains six unique transpositions)

Additional Modes & Multiplications (cont.)

Messiaen Mode VI:

Messiaen Mode VI (ET)

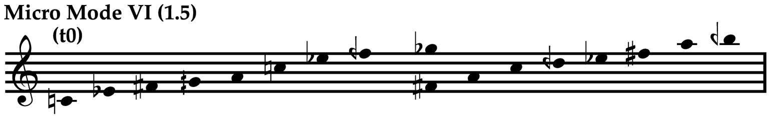


(six unique transpositions available)

Micro Mode VI (0.5)

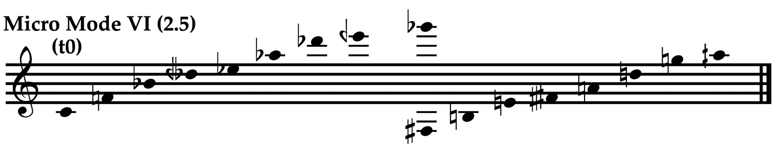
(retains six unique transpositions)

Micro Mode VI (1.5)



(retains six unique transpositions)

Micro Mode VI (2.5)



(retains six unique transpositions)

REFERENCES

Ballif, Claude. *Premier cahier Ivan Wyschnegradsky.* Paris: Association Ivan Wyschnegradsky, 1985.

Bancquart, Alain. *Musique: habiter le temps.* Lyon: Symétrie, 2002.

Boulez, Pierre. *Boulez on Music Today.* Translated by Susan Bradshaw, Cambridge: Harvard University Press, 1971.

Cowell, Henry. *New Musical Resources*. London: Cambridge University Press, 1958.

Donahue, Thomas. *A Guide to Musical Temperament*. Lanham, Maryland: Scarecrow Press, 2005.

Downes, Michael. *Jonathan Harvey:* Song Offerings *and* White as Jasmine. Ashgate Publishing Company, 2009.

Duffin, Ross. *How Equal Temperament Ruined Harmony (and Why You Should Care)*. New York: W. W. Norton & Co., 2006.

Dunn, David, ed. *Harry Partch: An Anthology of Critical Perspectives*. Singapore: Hardwood Academic Publishers, Contemporary Music Studies, vol. 9, 2000.

Friedmann, Michael. *Ear Training for Twentieth-Century Music.* New Haven: Yale University Press, 1990.

Gayden, Lucile. *Ivan Wyschnegradsky*. Frankfurt: M.P. Belaieff, 1973.

Gilmore, Bob. "Changing the Metaphor: Ratio Models of Musical Pitch in the Work of Harry Partch, Ben Johnston, and James Tenney." *Perspectives of New Music,* Winter - Summer, 1995, vol. 33, no. 1/2, pp. 458-503.

Gollin, Edward. and Alexander Rehding. *The Oxford Handbook of Neo-Riemannian Music Theories*. New York: Oxford University Press, 2011.

Gunden, Heidi Von. *The Music of Ben Johnston*. Metuchen: The Scarecrow Press, Inc., 1986.

Haba, Alois. *Mein Weg zur Viertel- und Sechsteltonmusik.* Düsseldorf: Gesellschaft zur Förderung der systematischen Musikwissenschaft e.V., 1971.

Helmholtz, Hermann. *On the Sensation of Tone*. New York: Dover Publications, 1954.

Hesse, Horst-Peter. *Grundlagen der Harmonik in mikrotonaler Musik.* Innsbruck: Edition Helbling, 1989.

Jameux, Dominique. *Pierre Boulez*. Cambridge: Harvard University Press, 1991.

Ives, Charles. "Some Quarter-Tone Impressions." *Franco-American Musical Society Bulletin*, 1925, pp. 20-29.

Ives, Charles. Howard Boatwright, ed. *Essays Before a Sonata (and Other Writings)*. New York: W.W. Norton & Company Inc., 1962.

Johnston, Ben. *"Maximum Clarity" and Other Writings on Music*. Urbana: University of Illinois Press, 2006.

Jedrzejewski, Franck. *"Dictionnaire des musiques microtonales."* Paris: L'Harmattan, 2003.

Koblyakov, Lev. *Pierre Boulez: A World of Harmony*. Chur: Harwood Academic Publishers, 1990.

Messiaen, Olivier. *Technique de mon langage musical.* Paris: Alphonse Leduc, vols. 1 & 2, 1944.

Moreno, Enrique. *Expanded Tunings in Contemporary Music*. Lewiston, New York: The Edwin Mellen Press, 1990.

Neuwirth, Erich. *Musical Temperaments*. Vienna: Springer-Verlag/Wien, 1997.

Palmer, John. *Jonathan Harvey's Bhakti for Chamber Ensemble and Electronics*. Lewiston: The Edwin Mellen Press, 2001.

Partch, Harry. *Genesis of a Music*. Madison: The University of Wisconsin Press, 1949.

Pole, William. *Philosphy of Music*. London: Trüber & Co., 1895.

Paddison, Max. and Irène Deliège. *Contemporary Music*. Burlington: Ashgate Publishing Company, 2010.

Pople, Anthony. *Messiaen: Quatuor pour le fin du temps.* London: Cambridge University Press, 1998.

Rae, Charles Bodman. *The Music of Lutoslawski*, 3rd ed. London: Faber and Faber, 1999.

Sadie, Stanley, ed. *The New Grove Dictionary of Music and Musicians*, 2nd ed., vol. 25, 2001.

Schuijer, Michiel. *Analyzing Atonal Music: Pitch-Class Set Theory and Its Contexts*. Rochester: University of Rochester Press, 2008.

Steinitz, Richard. *György Ligeti: Music of the Imagination*. Boston: Northeast University Press, 2003.

Stucky, Steven. *Lutoslawski and His Music*. London: Cambridge University Press, 1981.

Whitman, George. *Introduction to Microtonal Music*. London: Eveleigh Printing Ltd., 1970.

Wuorinen, Charles. *Simple Composition*. New York: Longman Inc., 1979.

Wyschnegradsky, Ivan. *La loi de la pansonorité.* Geneva: Editions Contrechamps, 1996.

A PORTFOLIO OF THREE WORKS

A Dissertation

Presented to the Faculty of the Graduate School

of Cornell University

In Partial Fulfillment of the Requirements for the Degree of

Doctor of Musical Arts

by

Jesse Benjamin Jones

January 2013

A PORTFOLIO OF THREE WORKS

Jesse Benjamin Jones, D.M.A.
Cornell University 2013

This portfolio consists of three pieces that span three years: compositions that progressively show my interest in 1) literal reference to literature and poetry, 2) more amorphous, viscous musical textures, and 3) systematic microtonal procedures—interests which I hope combine to create a meaningful, visceral, even spiritual experience for the listener. This progression is subtle, but it illustrates how my musical language has shifted to accommodate such elements: from more traditional forms of notation and expression to those of controlled aleatory and direct reference to physical objects, emotions, and scenes.

The first piece, *Threshold*, is a sounding board for the calming influence of a poem by Rabindranath Tagore, in which a tenor describes, by way of vivid imagery, the transition of the soul from this life to the next. A sinfonietta ensemble, present mostly in the background, musically paints the emotions of the text.

Harmonies poétiques et religieuses is a setting of French texts by Alphonse de Lamartine. Here a mezzo-soprano sings, speaks, and vocalizes over a flute, clarinet, violin, and cello, in a dreamlike state of suspension from reality. The text depicts the closeness and/or distance from the divine, the emotions attached to both piety and apostasy.

The third piece, . . . *the lone and level sands*, also for sinfonietta, sonically depicts the text *Ozymandias*, by Percy Shelley. Here the music follows the sonnet-like structure of the text, musically painting its imagery without its actual presence.

BIOGRAPHICAL SKETCH

Composer, conductor, and mandolinist Jesse Jones (b. 1978) is an American artist of wide-ranging tastes and influences. His music has been performed across North America, Europe, and Asia, and has received numerous accolades both at home and abroad. Jones has been honored with the Elliott Carter Rome Prize in Composition from the American Academy in Rome, a Barlow Commission, the Susan and Ford Schumann Fellowship from the Aspen Music Festival and School, and the Charles Ives Scholarship from the American Academy of Arts and Letters. He has also been awarded the Mary Greves Fellowship from the Tanglewood Music Center, the Heckscher Prize in Composition from Ithaca College, and the Sage Fellowship from Cornell University. Jones has participated in the Underwood New Music Readings of the American Composers Orchestra, received fellowships and honors from the University of Oregon, and enjoyed awards from ASCAP. Jones's music can be heard on Albany Records, and his choral music is published internationally by Earthsongs.

The American Composers Orchestra, the Cornell Symphony and Wind Ensemble, the Oregon Composers Orchestra, the New Frontiers Chamber Orchestra, the Grande Ronde Symphony Orchestra and others have presented Jones's orchestral works. Others of his compositions have been programmed by the Camerata Notturna, the Argento Chamber Ensemble, the Open End Ensemble, counter)induction, Pulse, the Momenta and iO String Quartets, the New Fromm Players, the Ithaca College Contemporary Ensemble, the Aspen Contemporary Ensemble, the Israeli Chamber Project, Ossia, So Percussion, FIREWORKS, and the Eugene Contemporary Chamber Ensemble. Jones has been commissioned by soloists such as Joseph Lin (violin), Kenneth Meyer (guitar), and Jeff Zeigler (cello), by the Scharoun Ensemble (of the Berlin Philharmonic), and by the Juilliard String Quartet.

Jones holds a DMA in music composition from Cornell University, where he studied composition with Steven Stucky, Roberto Sierra, and Kevin Ernste, as well as piano with Xak Bjerken. In 2007, Jones earned his Master's degree in composition from the University of Oregon, under teachers David Crumb and Robert Kyr, and in 2005 his Bachelor's degree from Eastern Oregon University, under John McKinnon and Leandro Espinosa. In 2012, Jones was appointed Assistant Professor of Composition and Theory at the University of South Carolina.

ACKNOWLEDGMENTS

I wish to thank Steven Stucky for continual support and generosity, and for helping me see deeper into myself and the music I write; Roberto Sierra for advice and honest opinions; Kevin Ernste for instruction in electronic music, and for always pointing out the bigger picture; Christopher Stark for support, friendship, and innumerable conversations that have helped shape me as a musician; my Cornell colleagues Takuma Itoh, Amit Gilutz, Peter Fahey, and Eric Nathan for always inspiring me to work hard; Evan Cortens for technical assistance, friendship, and conversation; Judith Kellock, Joseph Lin, and Chris Kim for championing my music with such enthusiasm; Xak Bjerken for teaching me to relax at the piano, for playing and commissioning my music, and most of all for being a friend; David Crumb, Robert Kyr, John McKinnon, and Leandro Espinosa for each teaching me very specific concepts that remain with me to this day; Erin Jones for being a constant source of support.

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THRESHOLD

Jesse Jones
(2012)

Written for tenor Zach Finkelstein

and the Cornell Festival Chamber Orchestra

THRESHOLD

Jesse Jones

INSTRUMENTATION

Flute

Oboe

B-flat Clarinet

Bassoon

Horn

C Trumpet

Trombone

Percussion

Piano

Tenor Solo

2 Violins

Viola

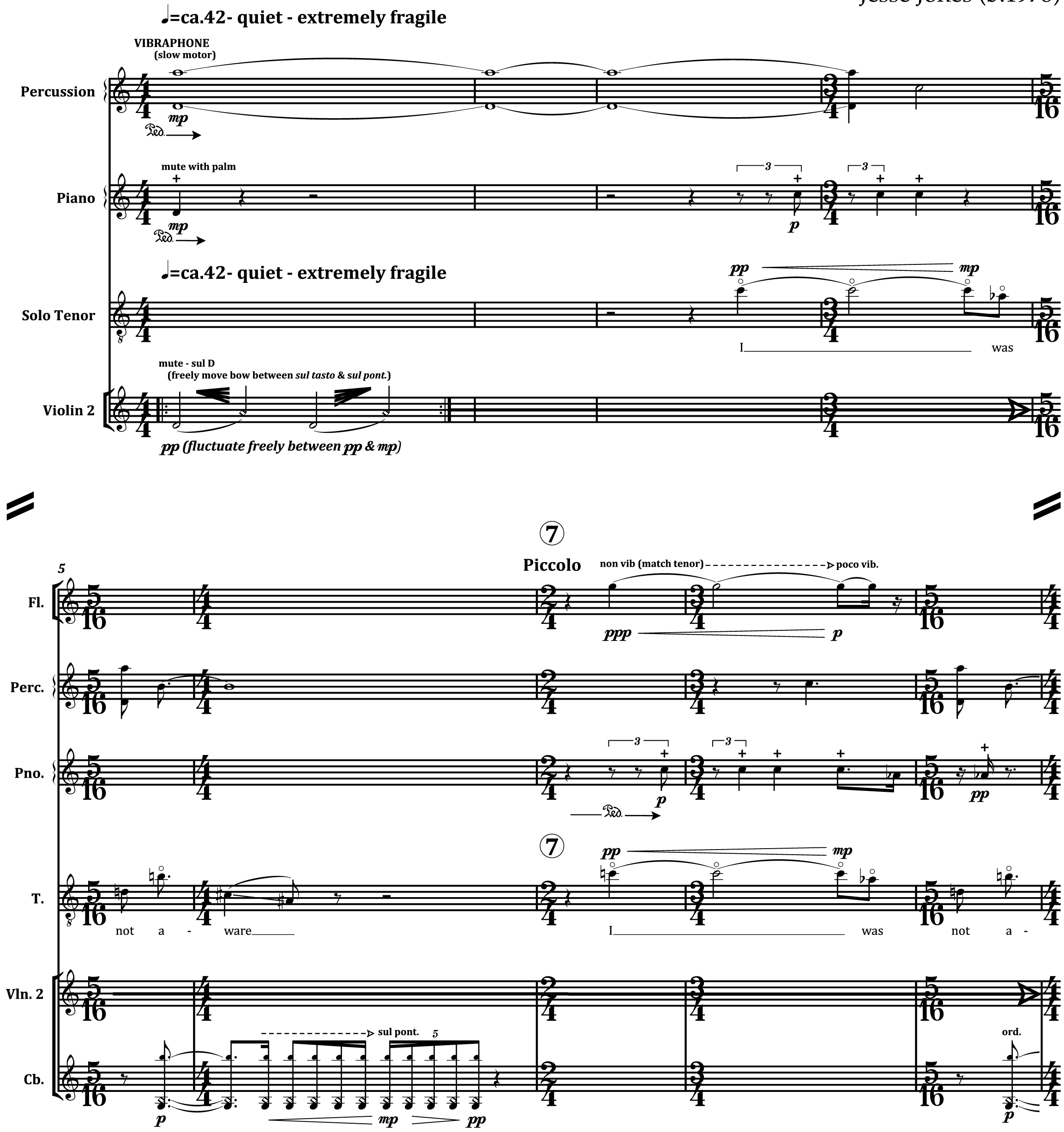
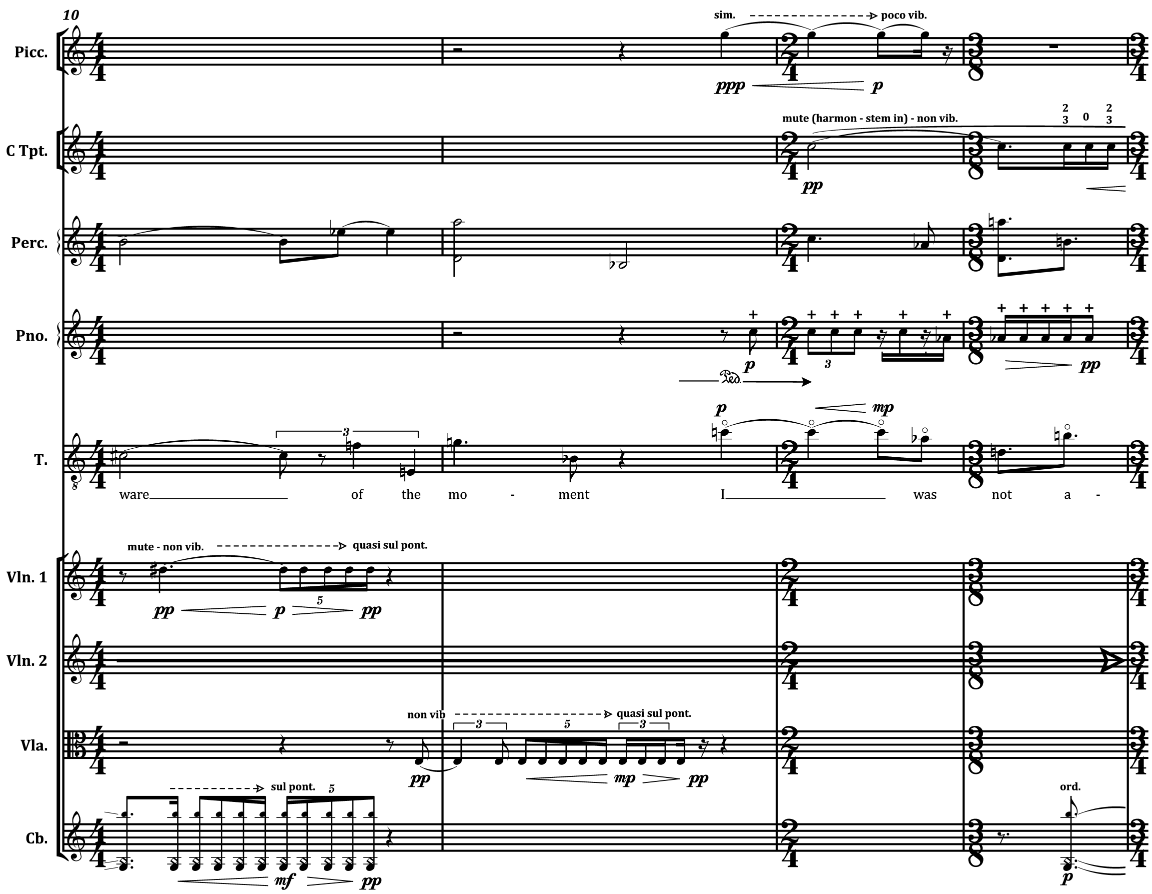
Violoncello

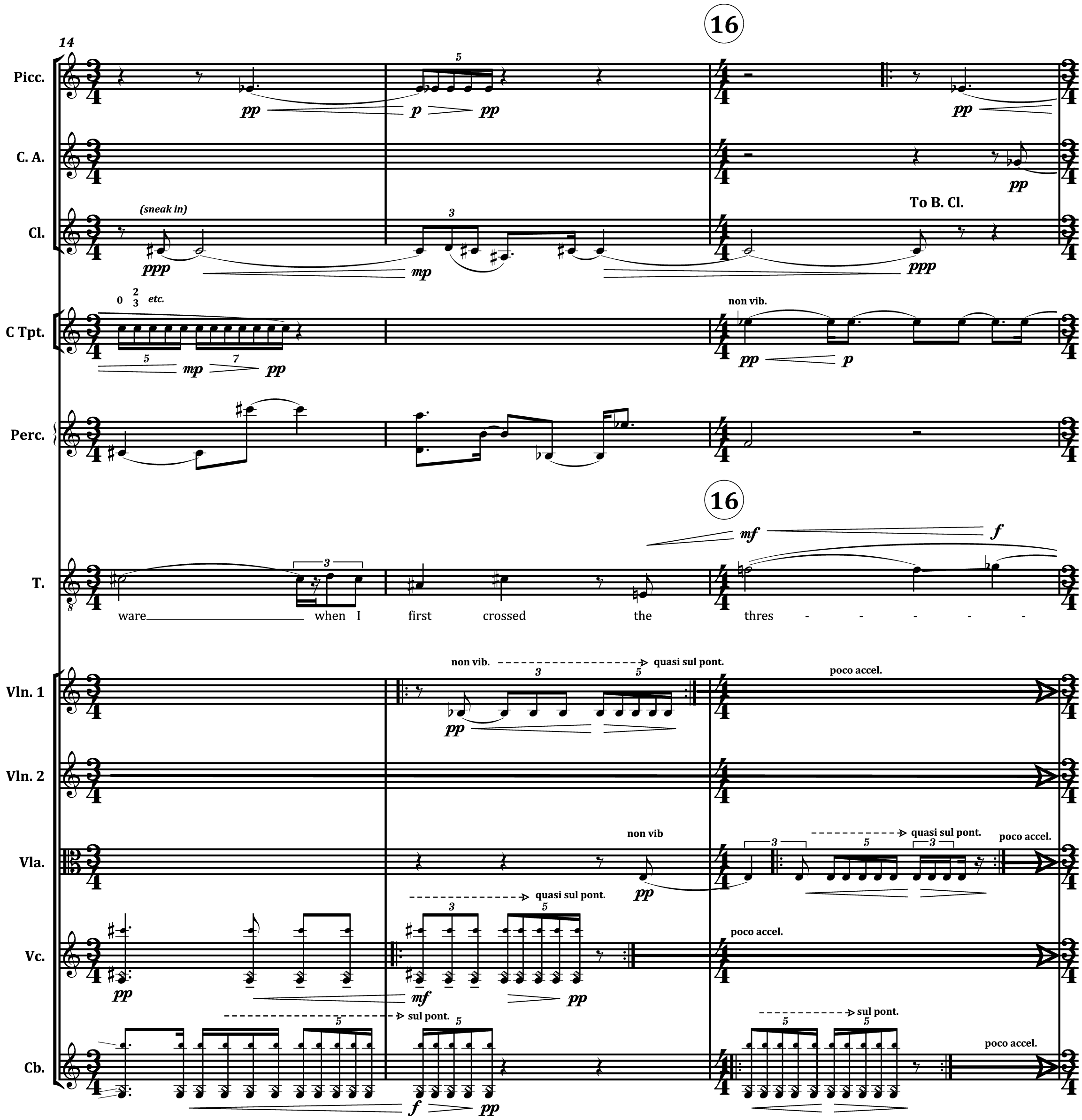
Contrabass

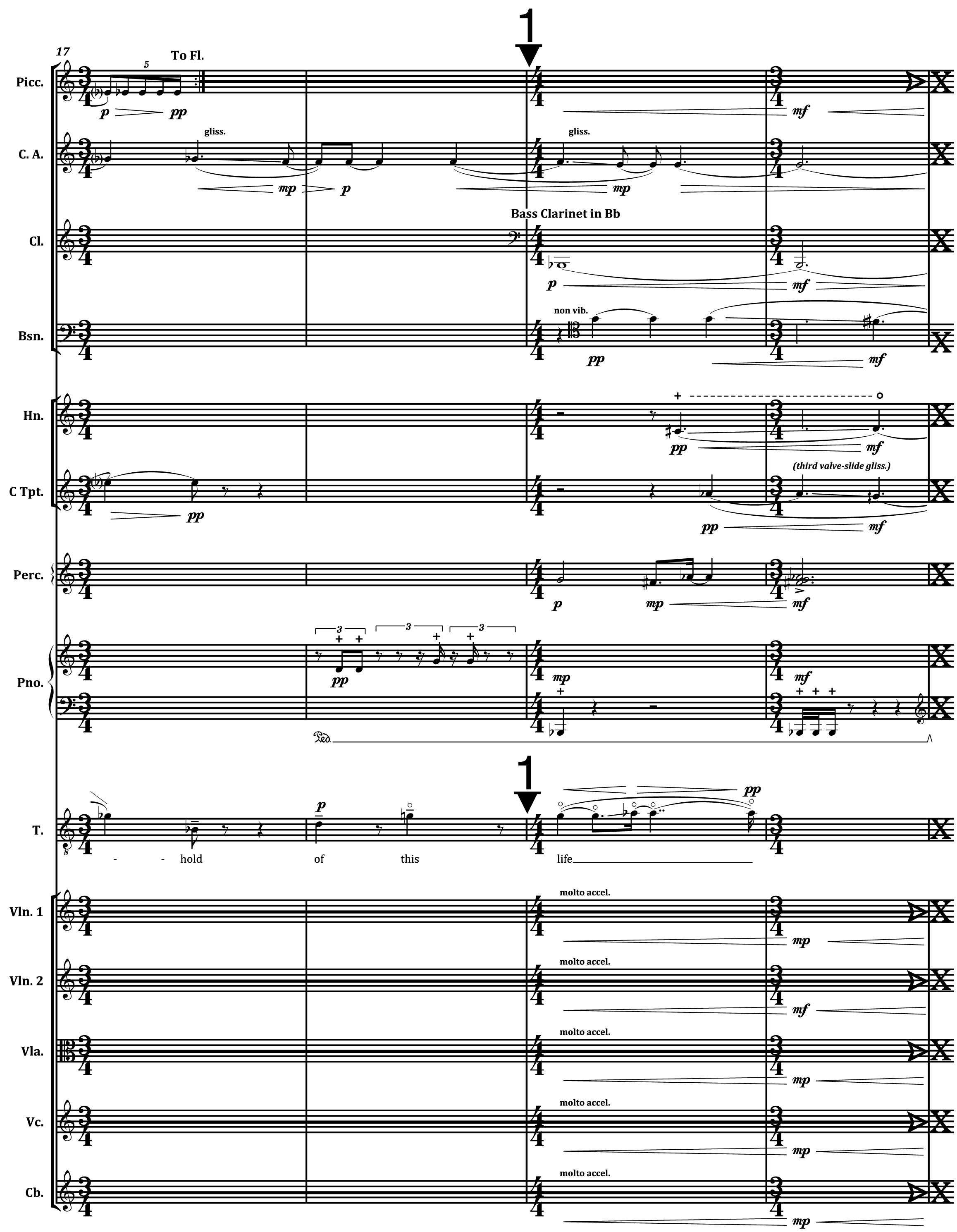
Duration: ca. 9.5 minutes

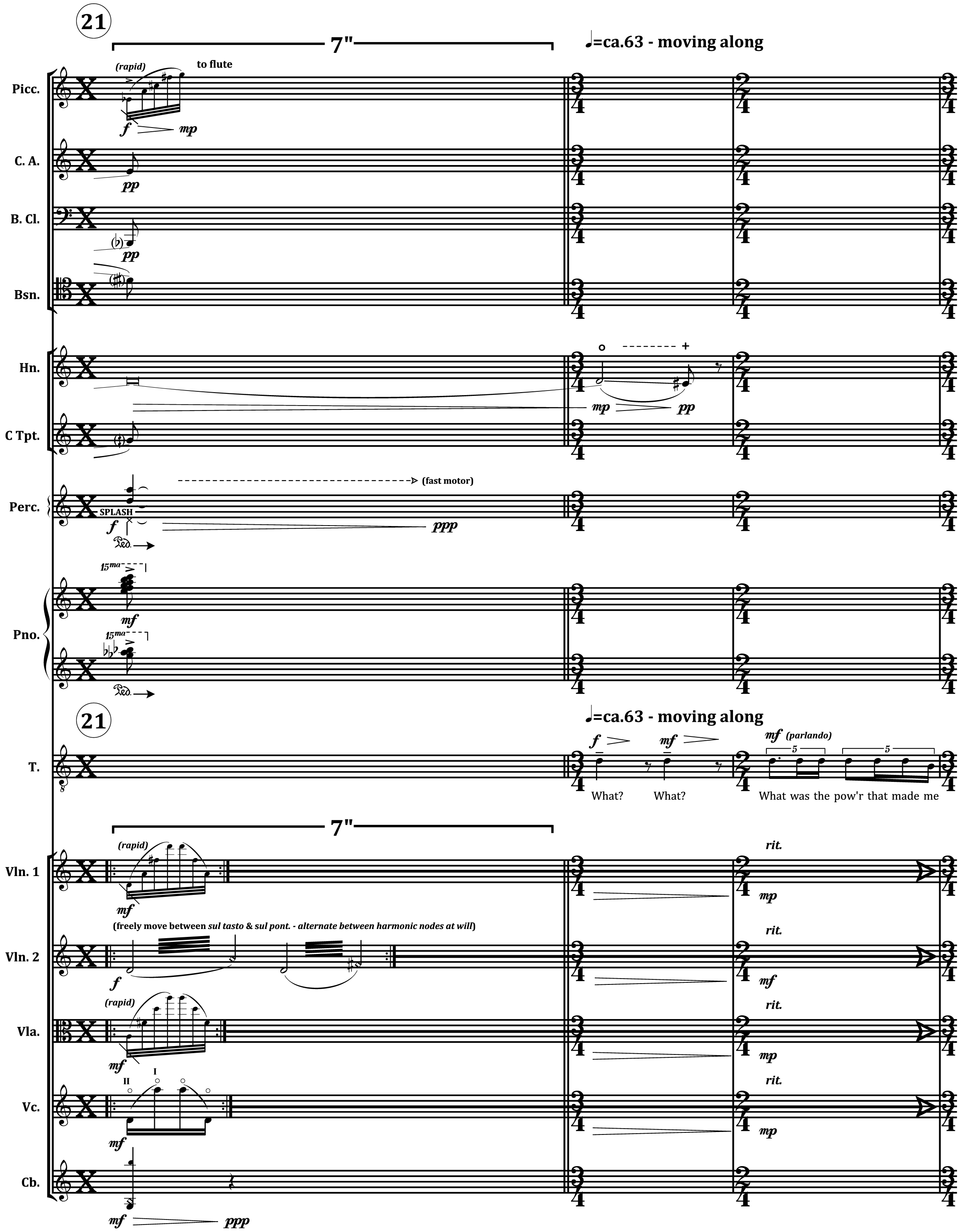
THRESHOLD

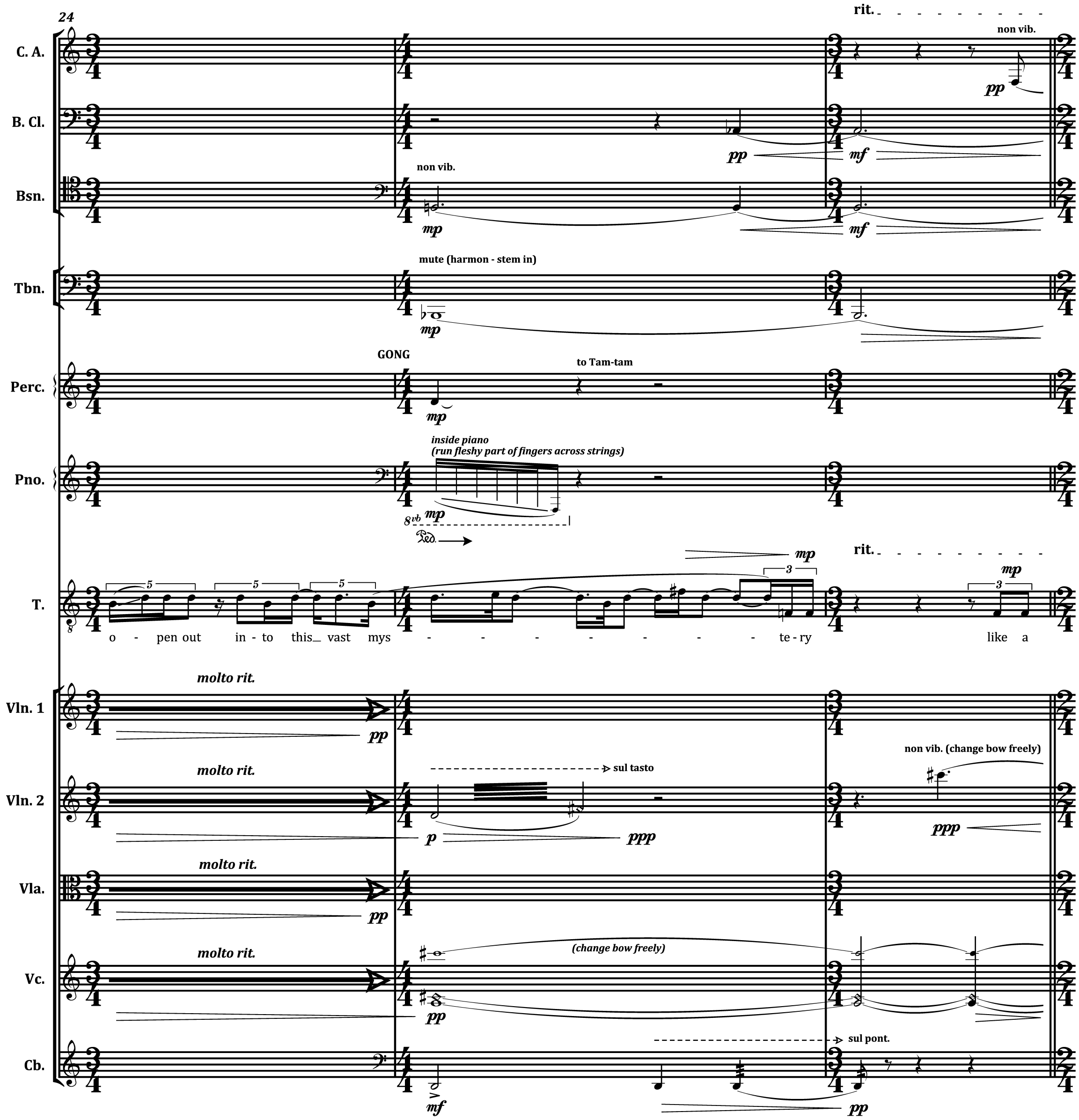
Rabindranath Tagore

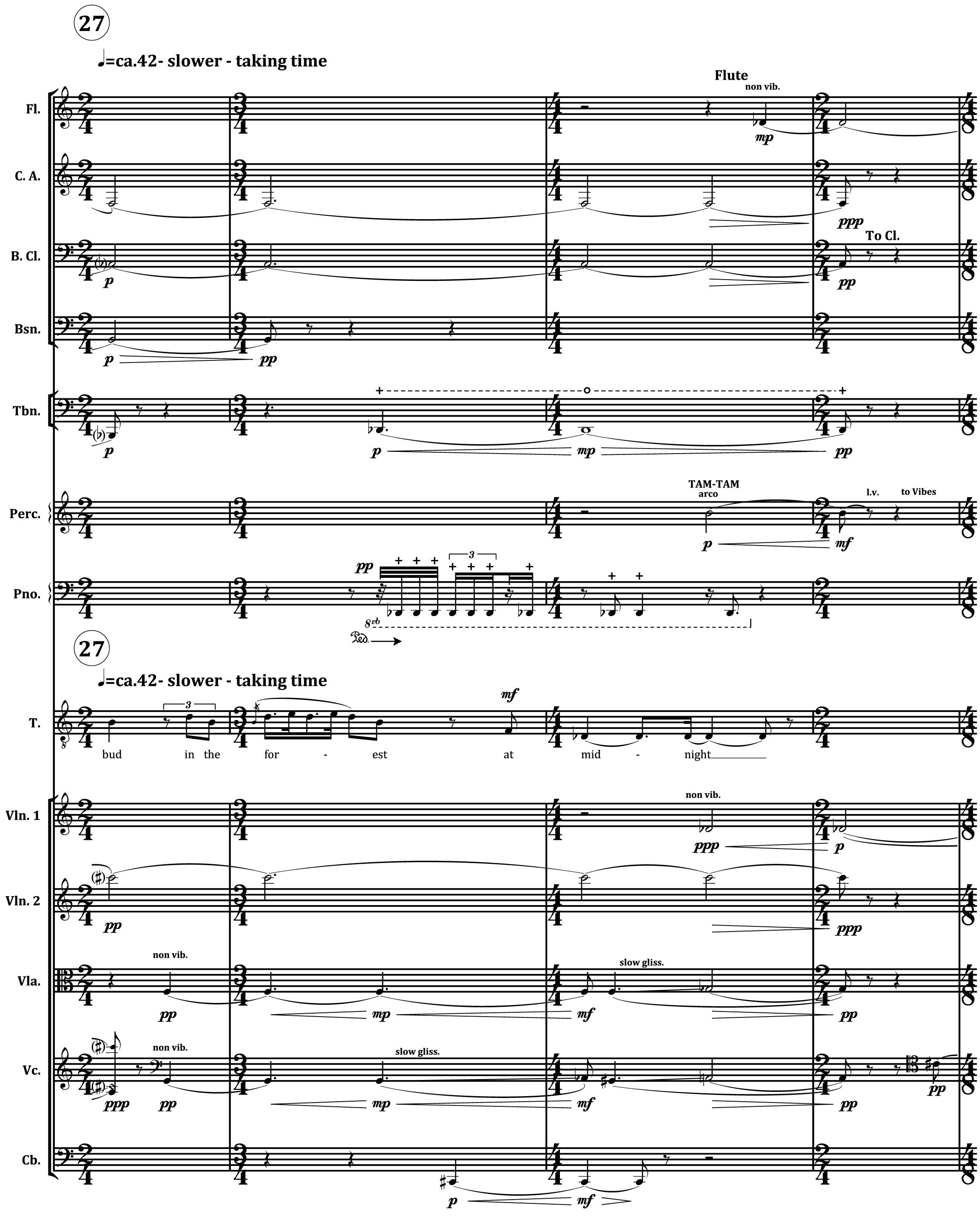
Jesse Jones (b.1978)


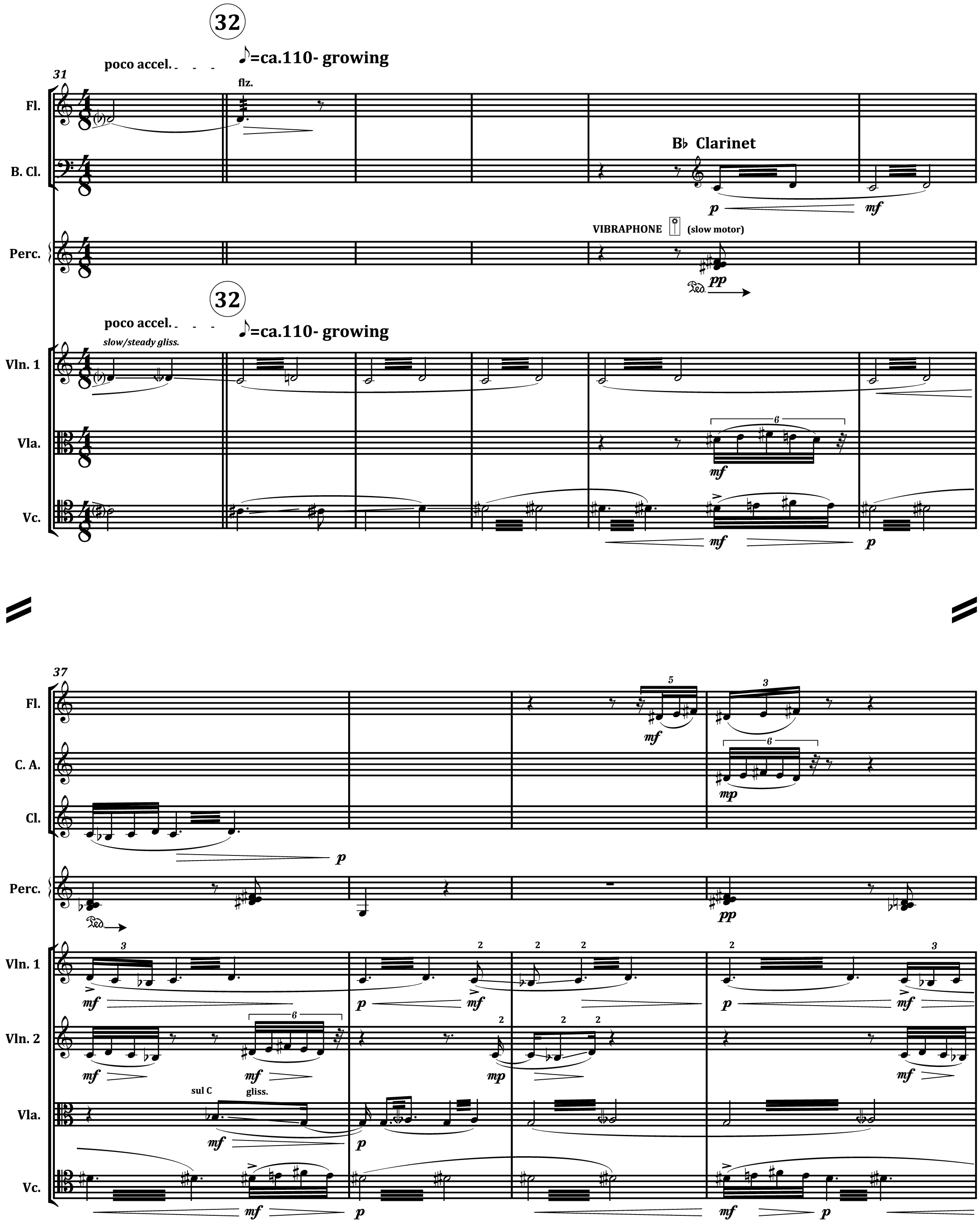
10
Picc.
C Tpt.
Perc.
Pno.
T.
Vln. 1
Vln. 2
Vla.
Cb.
sim.
poco vib.
mute (harmon - stem in) - non vib.
mute - non vib.
quasi sul pont.
non vib
quasi sul pont.
sul pont.
ord.
ware of the mo - ment I was not a -


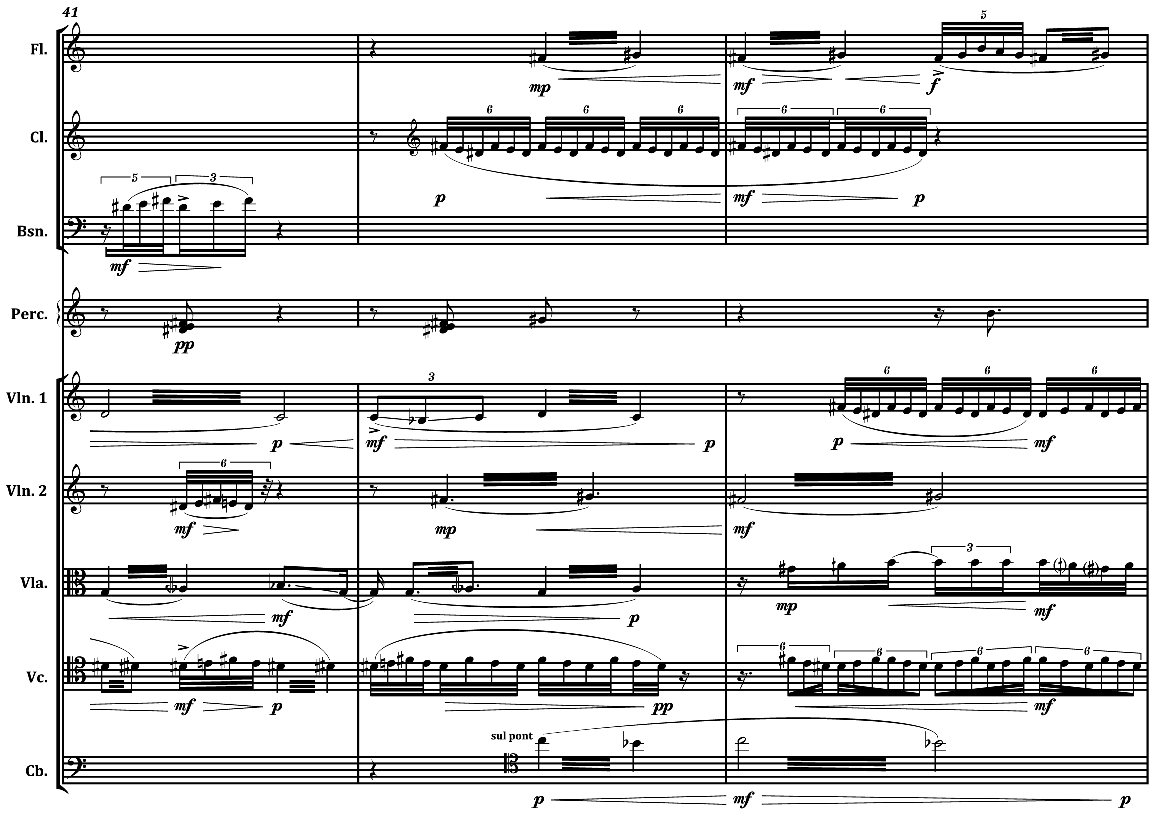
14
16
Picc.
C. A.
Cl.
C Tpt.
Perc.
T.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
(sneak in)
To B. Cl.
etc.
non vib.
ware when I first crossed the thres - - - - - -
non vib.
quasi sul pont.
poco accel.
non vib
sul pont.


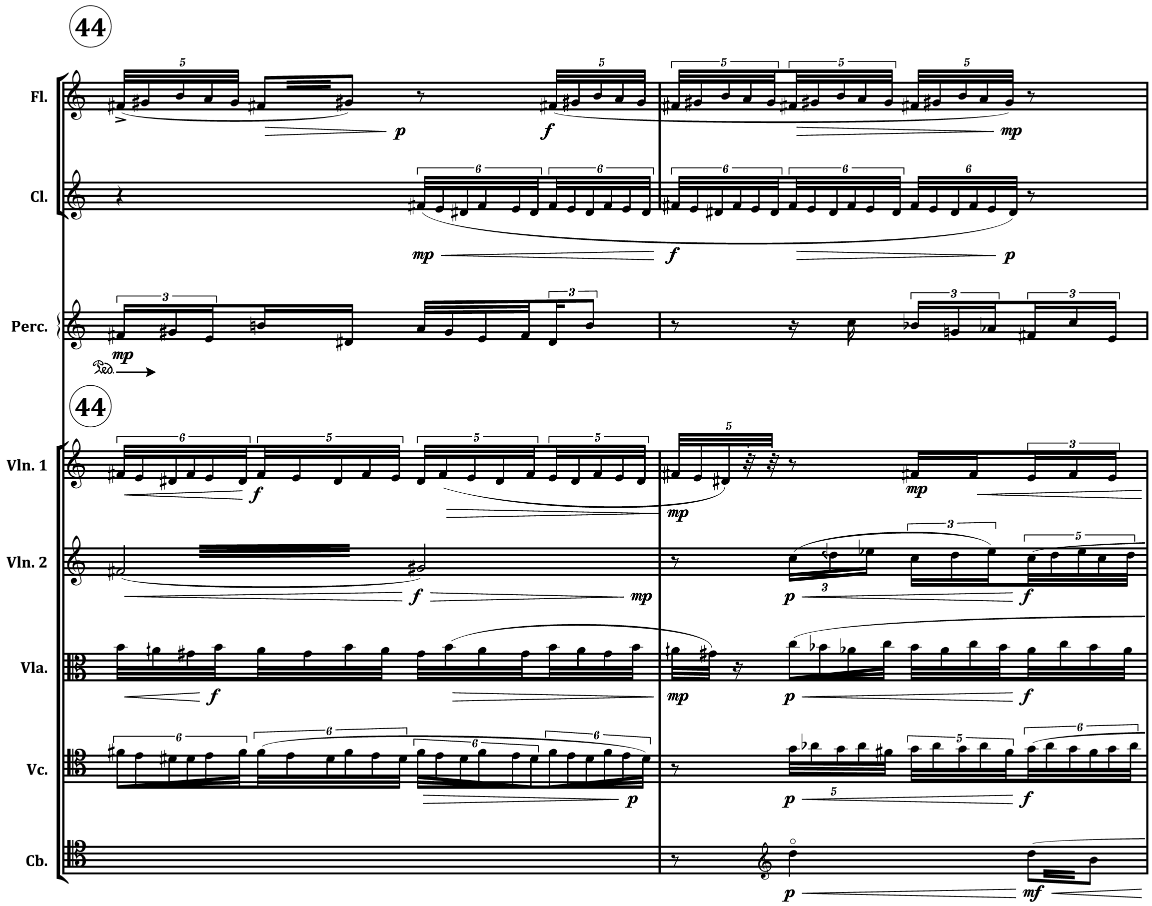
17
To Fl.
1
Picc.
C. A.
gliss.
Cl.
Bass Clarinet in Bb
Bsn.
non vib.
Hn.
C Tpt.
(third valve-slide gliss.)
Perc.
Pno.
T.
- - hold of this life
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
molto accel.


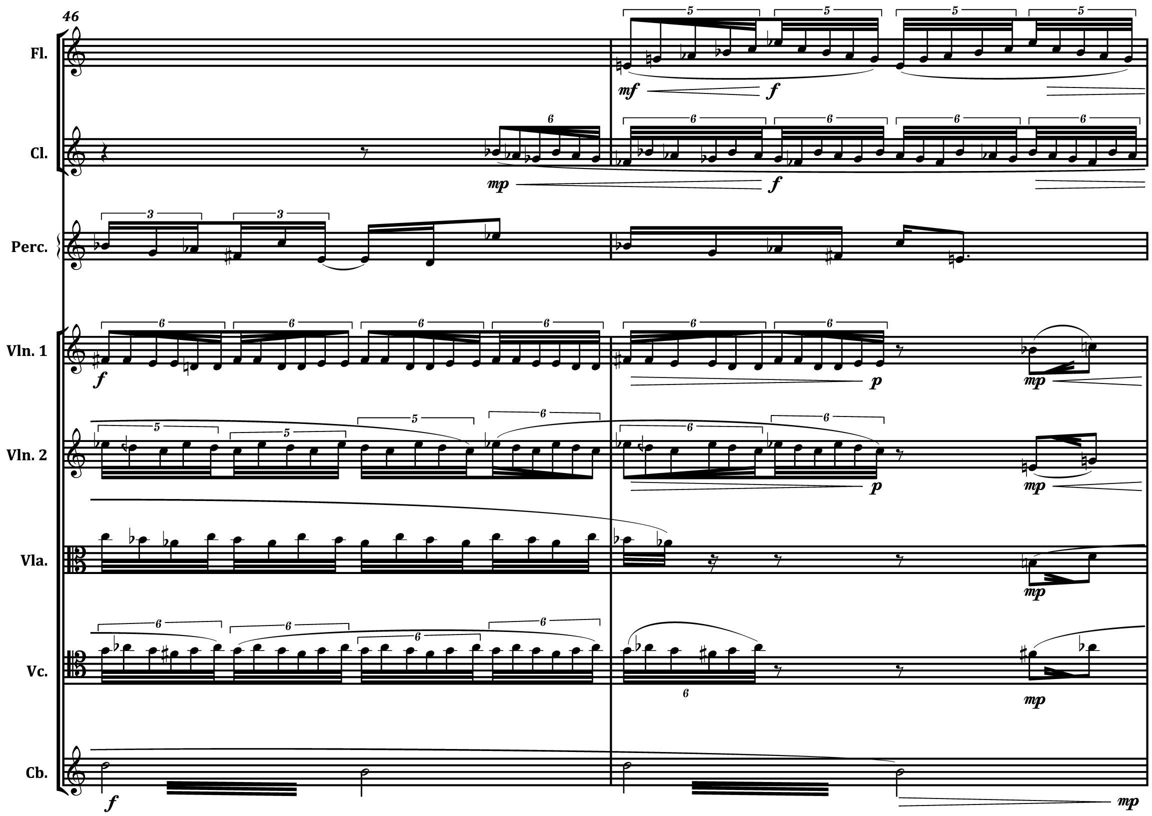
21
7"
♩=ca.63 - moving along
Picc.
(rapid)
to flute
f mp
C. A.
pp
B. Cl.
pp
Bsn.
Hn.
mp pp
C Tpt.
Perc.
(fast motor)
SPLASH
f ppp
Pno.
15ma
mf
15ma
T.
f mf
What? What?
mf (parlando)
What was the pow'r that made me
Vln. 1
(rapid)
mf
rit.
mp
(freely move between sul tasto & sul pont. - alternate between harmonic nodes at will)
Vln. 2
f
rit.
mf
Vla.
(rapid)
mf
rit.
mp
Vc.
II
I
mf
rit.
mp
Cb.
mf ppp


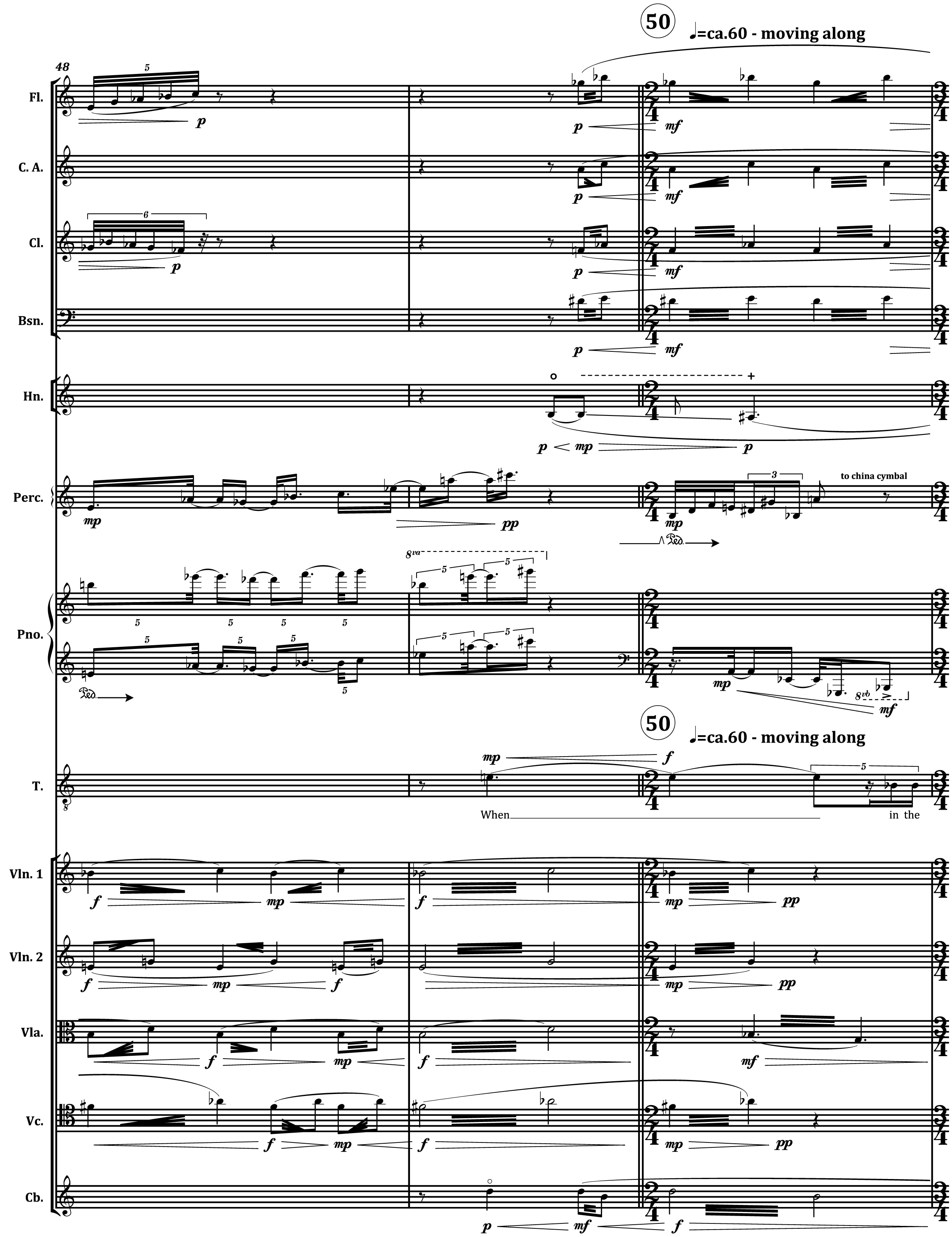
24
rit.
C. A.
B. Cl.
Bsn.
Tbn.
Perc.
Pno.
T.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
non vib.
mute (harmon - stem in)
GONG
to Tam-tam
inside piano
(run fleshy part of fingers across strings)
o - pen out in - to this vast mys - - - - - - - - te - ry like a
molto rit.
sul tasto
non vib. (change bow freely)
(change bow freely)
sul pont.


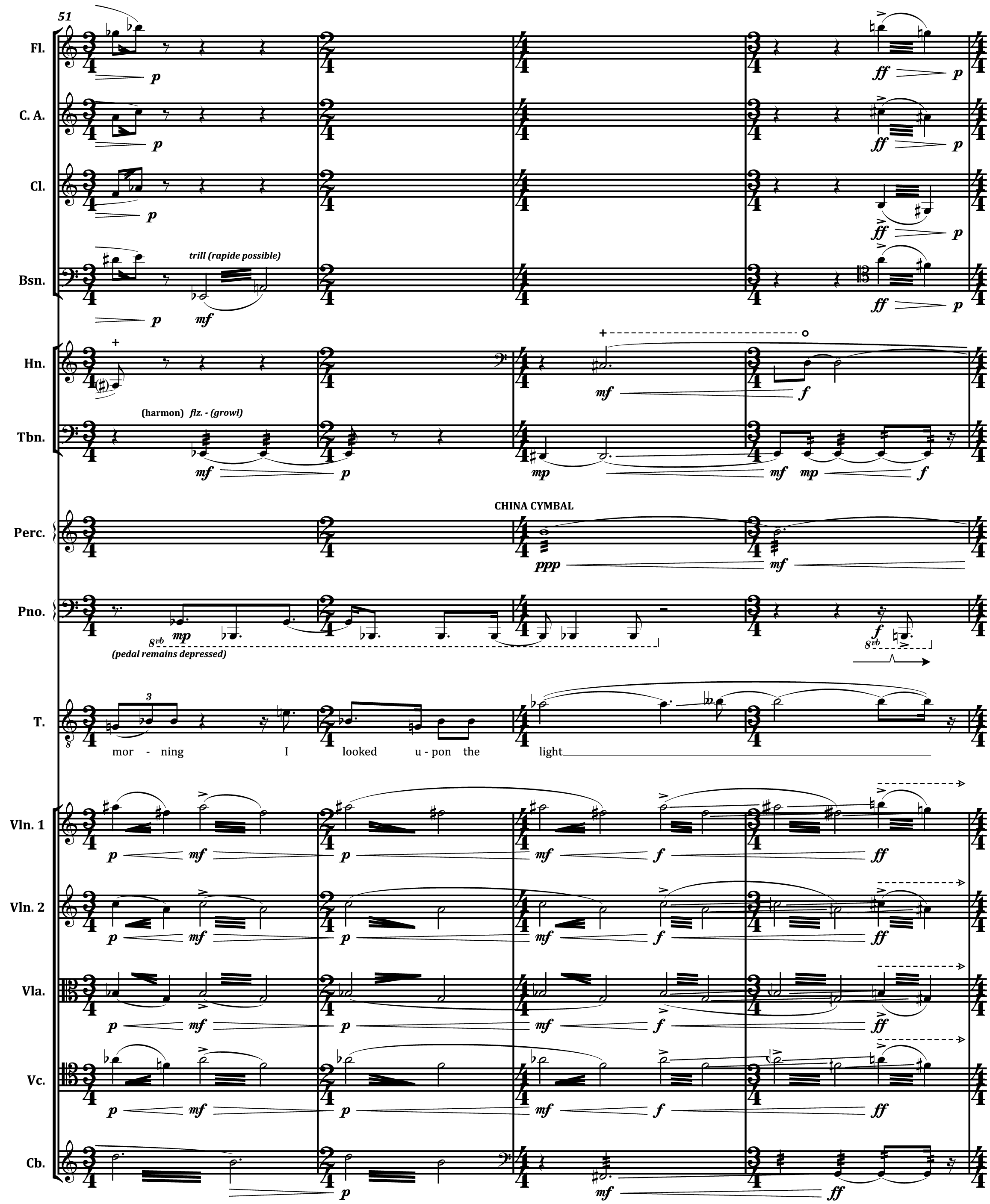
27
♩=ca.42- slower - taking time
Fl.
C. A.
B. Cl.
Bsn.
Tbn.
Perc.
Pno.
T.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
Flute
non vib.
To Cl.
TAM-TAM
arco
l.v.
to Vibes
non vib.
slow gliss.
bud in the for - est at mid - night


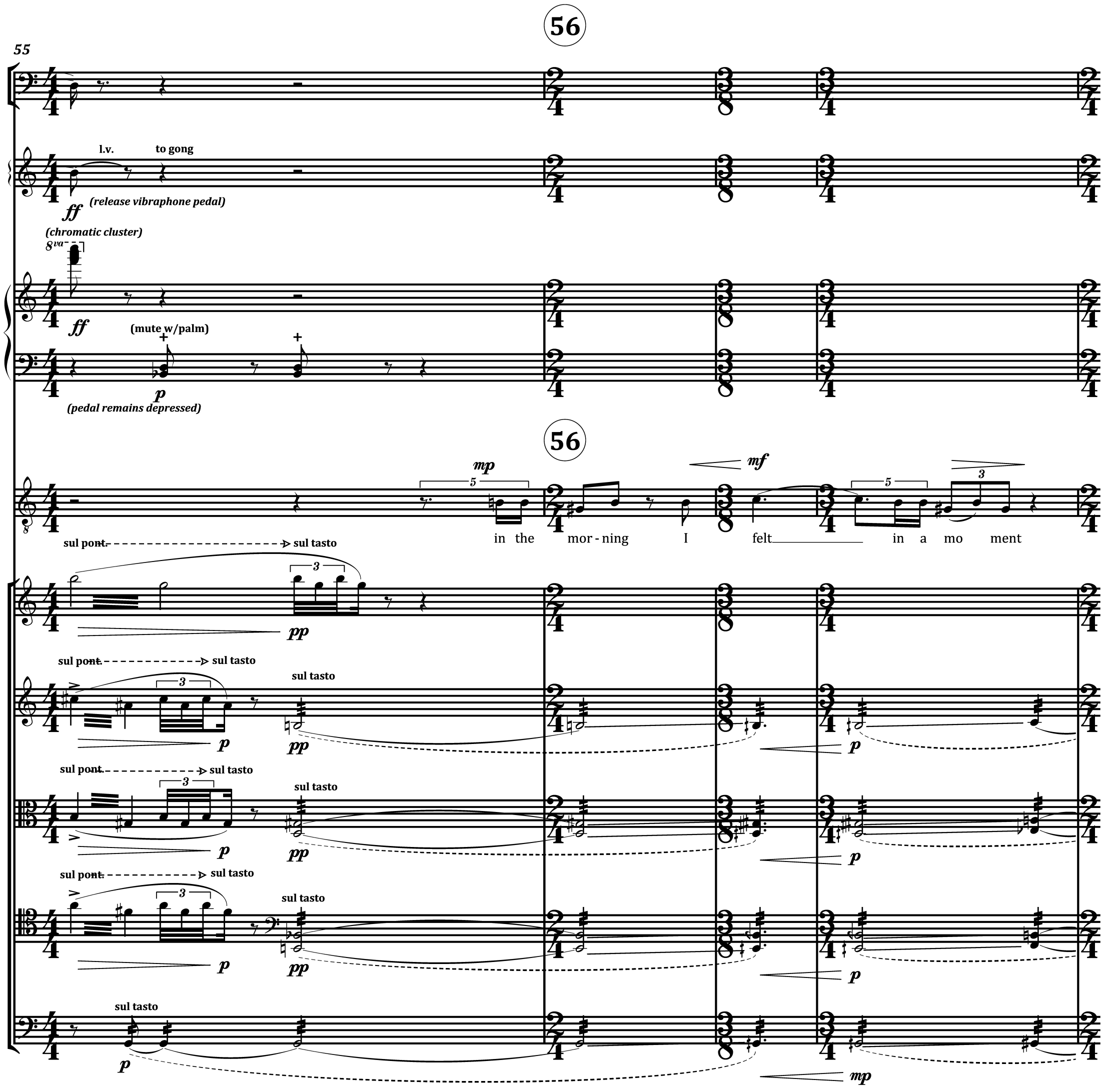
32
poco accel. - - -
♪=ca.110- growing
31
Fl.
flz.
B. Cl.
B♭ Clarinet
p
mf
VIBRAPHONE
(slow motor)
Perc.
pp
slow/steady gliss.
Vln. 1
Vla.
6
Vc.
mf
p
37
Fl.
5
3
C. A.
6
Cl.
mp
Vln. 2
sul C
gliss.
2


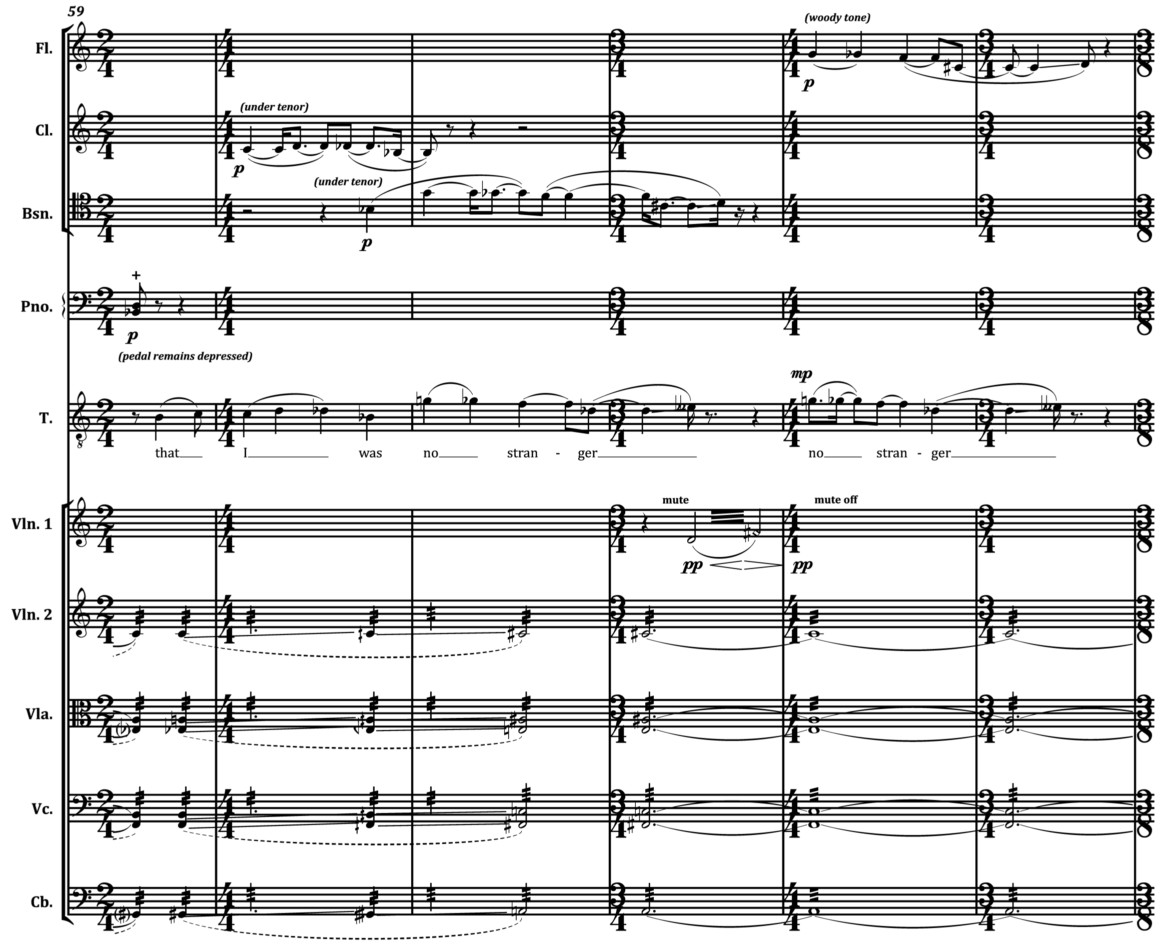
41
Fl.
Cl.
Bsn.
Perc.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
sul pont


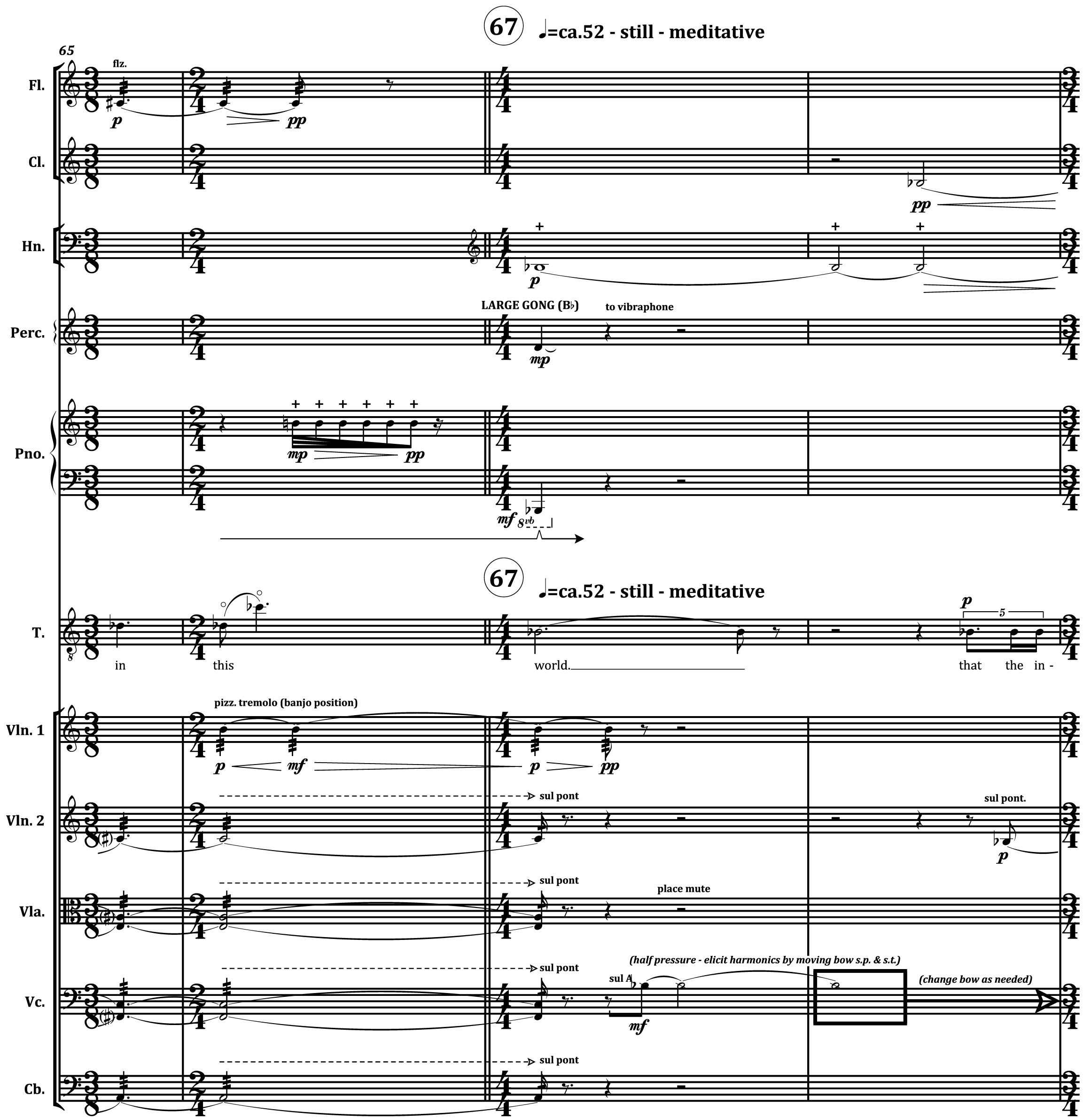
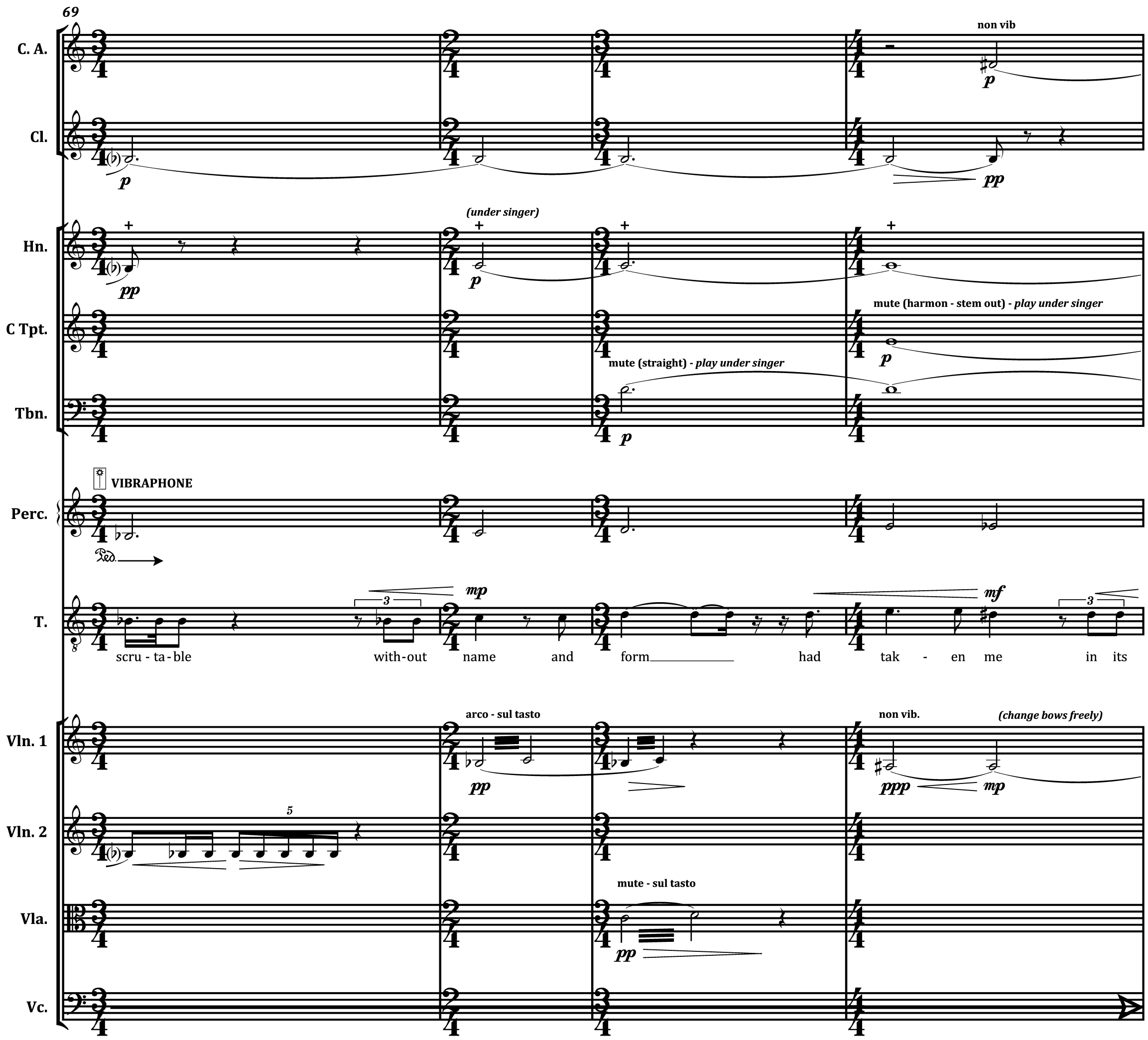
44
Fl.
Cl.
Perc.
44
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


46
Fl.
Cl.
Perc.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


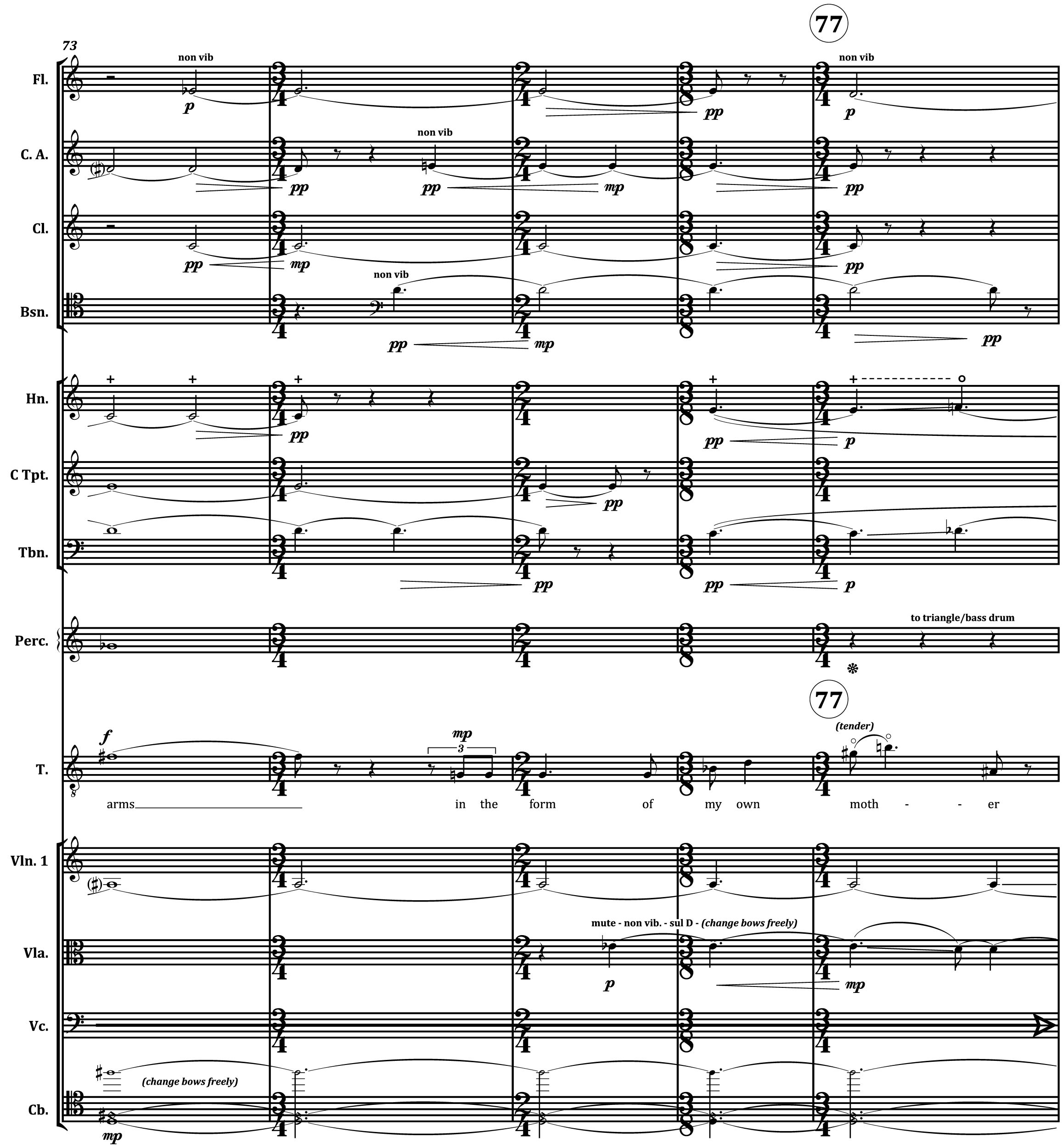
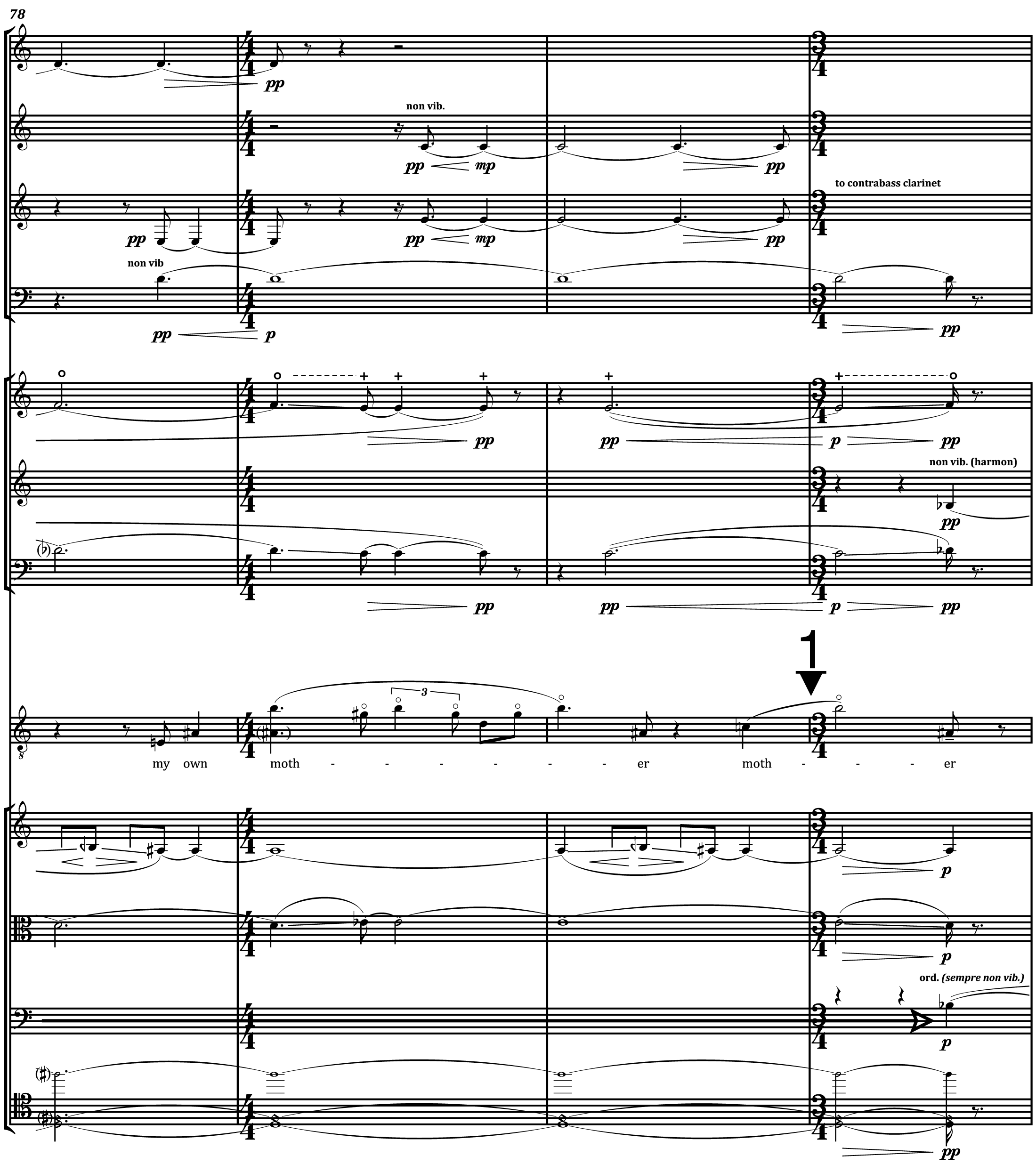
48
50
♩=ca.60 - moving along
Fl.
C. A.
Cl.
Bsn.
Hn.
Perc.
to china cymbal
Pno.
50
♩=ca.60 - moving along
T.
When
in the
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


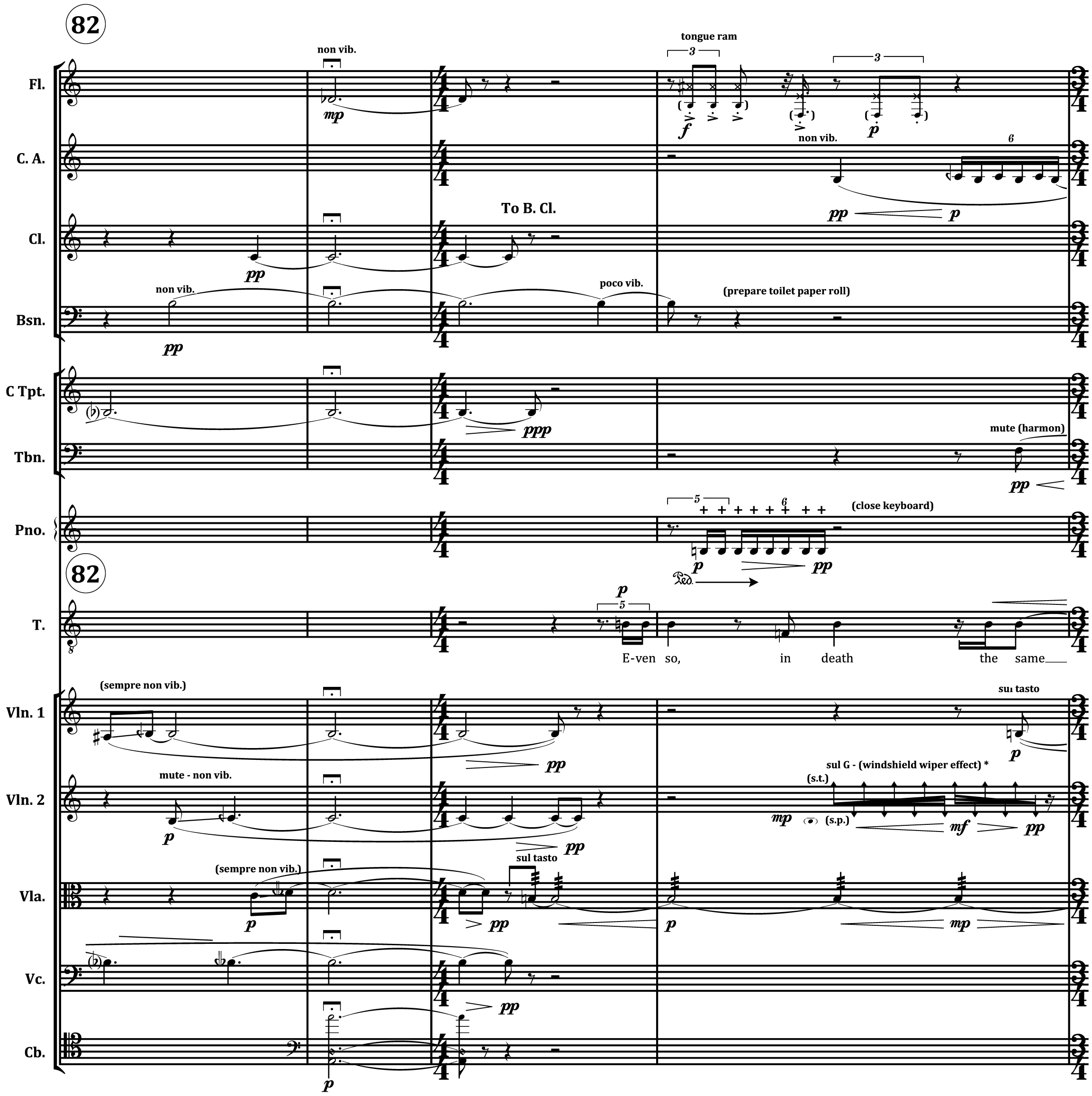
51
Fl.
C. A.
Cl.
Bsn.
trill (rapide possible)
Hn.
Tbn.
(harmon) flz. - (growl)
CHINA CYMBAL
Perc.
Pno.
(pedal remains depressed)
T.
mor - ning I looked u - pon the light
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


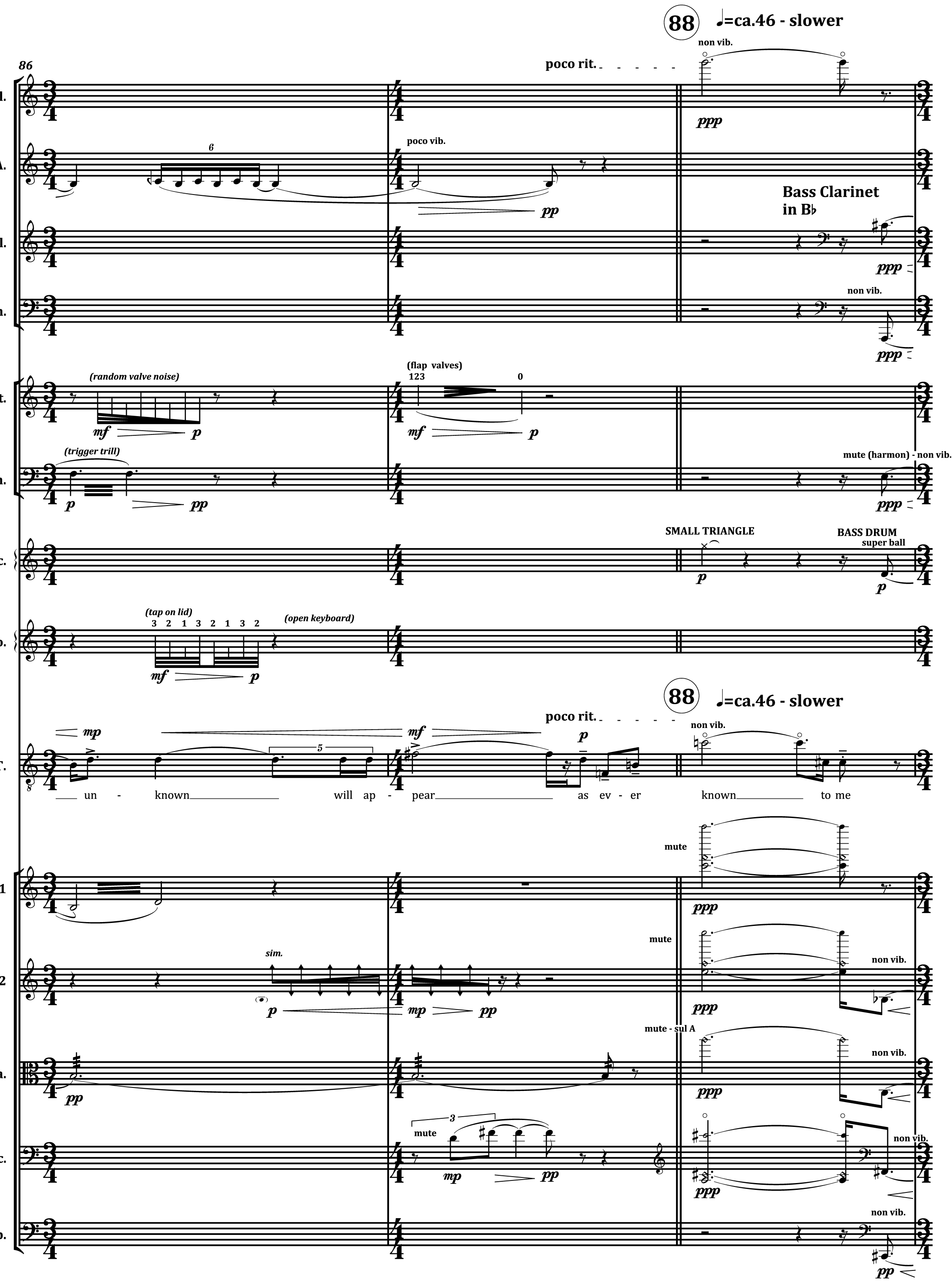
56
55
Hn.
Perc.
l.v.
to gong
ff
(release vibraphone pedal)
(chromatic cluster)
8va
Pno.
ff
(mute w/palm)
p
(pedal remains depressed)
56
T.
mp
mf
in the mor - ning I felt in a mo ment
sul pont.
sul tasto
Vln. 1
pp
Vln. 2
p
pp
Vla.
Vc.
Cb.
mp


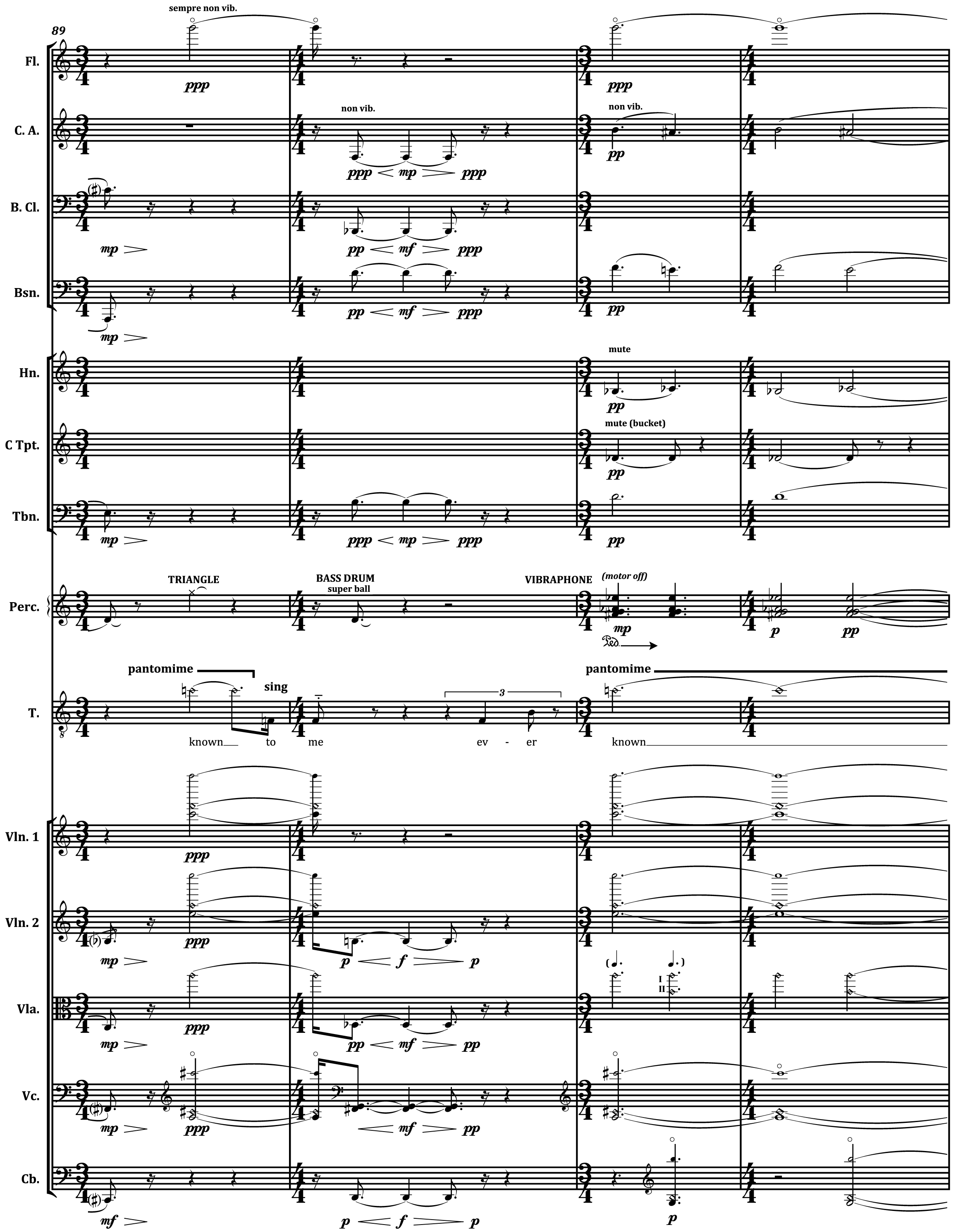
59
Fl.
Cl.
Bsn.
Pno.
T.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
(woody tone)
(under tenor)
(under tenor)
(pedal remains depressed)
that I was no stranger
no stranger
mute
mute off

67
♩=ca.52 - still - meditative
65
Fl.
flz.
p
pp
Cl.
pp
Hn.
p
Perc.
LARGE GONG (B♭)
to vibraphone
mp
Pno.
mp
pp
mf
8vb
67
♩=ca.52 - still - meditative
T.
p
5
in
this
world.
that
the
in -
Vln. 1
pizz. tremolo (banjo position)
p
mf
p
pp
Vln. 2
sul pont
sul pont.
p
Vla.
sul pont
place mute
Vc.
sul pont
(half pressure - elicit harmonics by moving bow s.p. & s.t.)
sul A
mf
(change bow as needed)
Cb.
sul pont


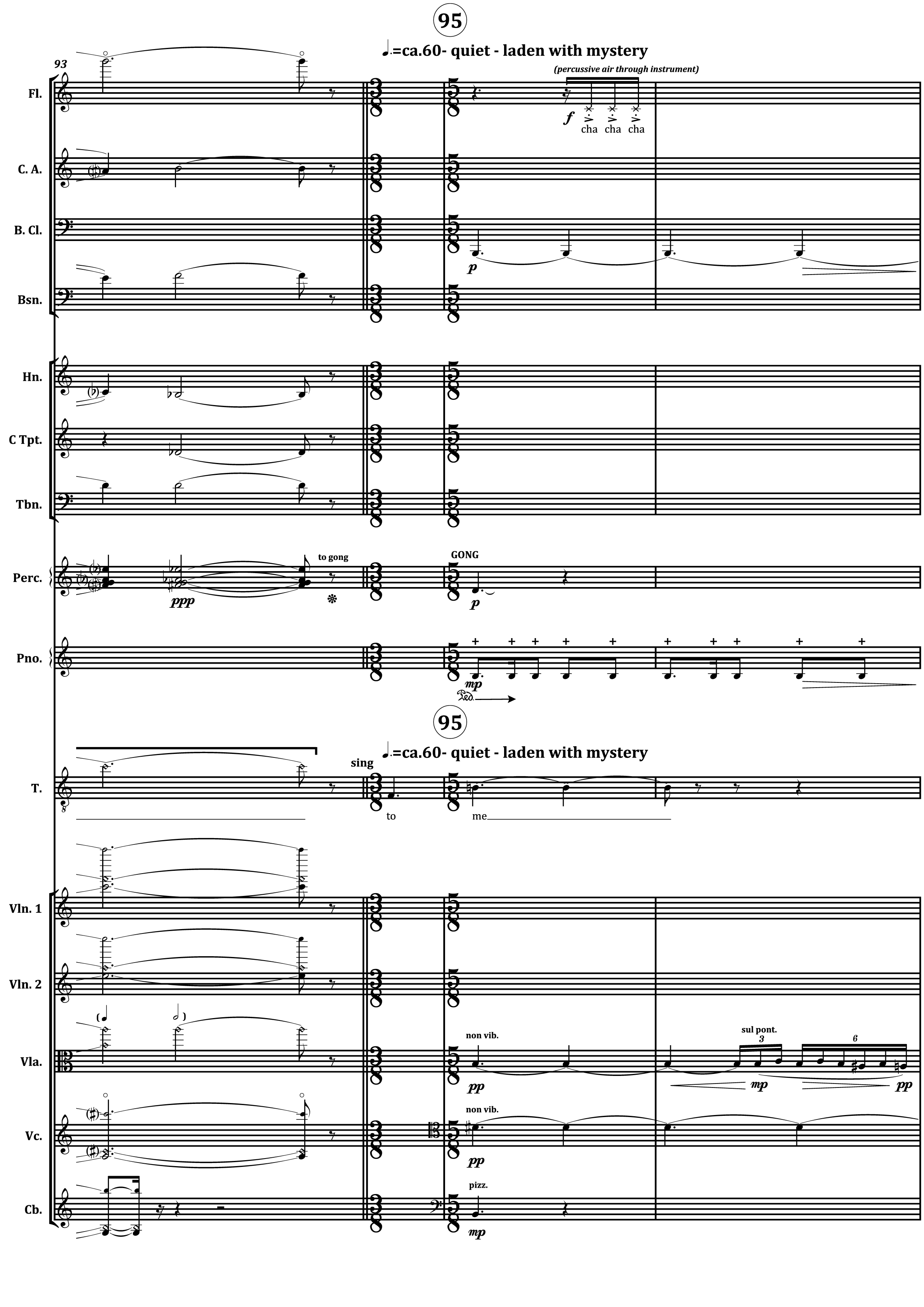
69
C. A.
Cl.
Hn.
C Tpt.
Tbn.
Perc.
T.
Vln. 1
Vln. 2
Vla.
Vc.
non vib
(under singer)
mute (harmon - stem out) - play under singer
mute (straight) - play under singer
VIBRAPHONE
scru - ta - ble with-out name and form had tak - en me in its
arco - sul tasto
non vib.
(change bows freely)
mute - sul tasto

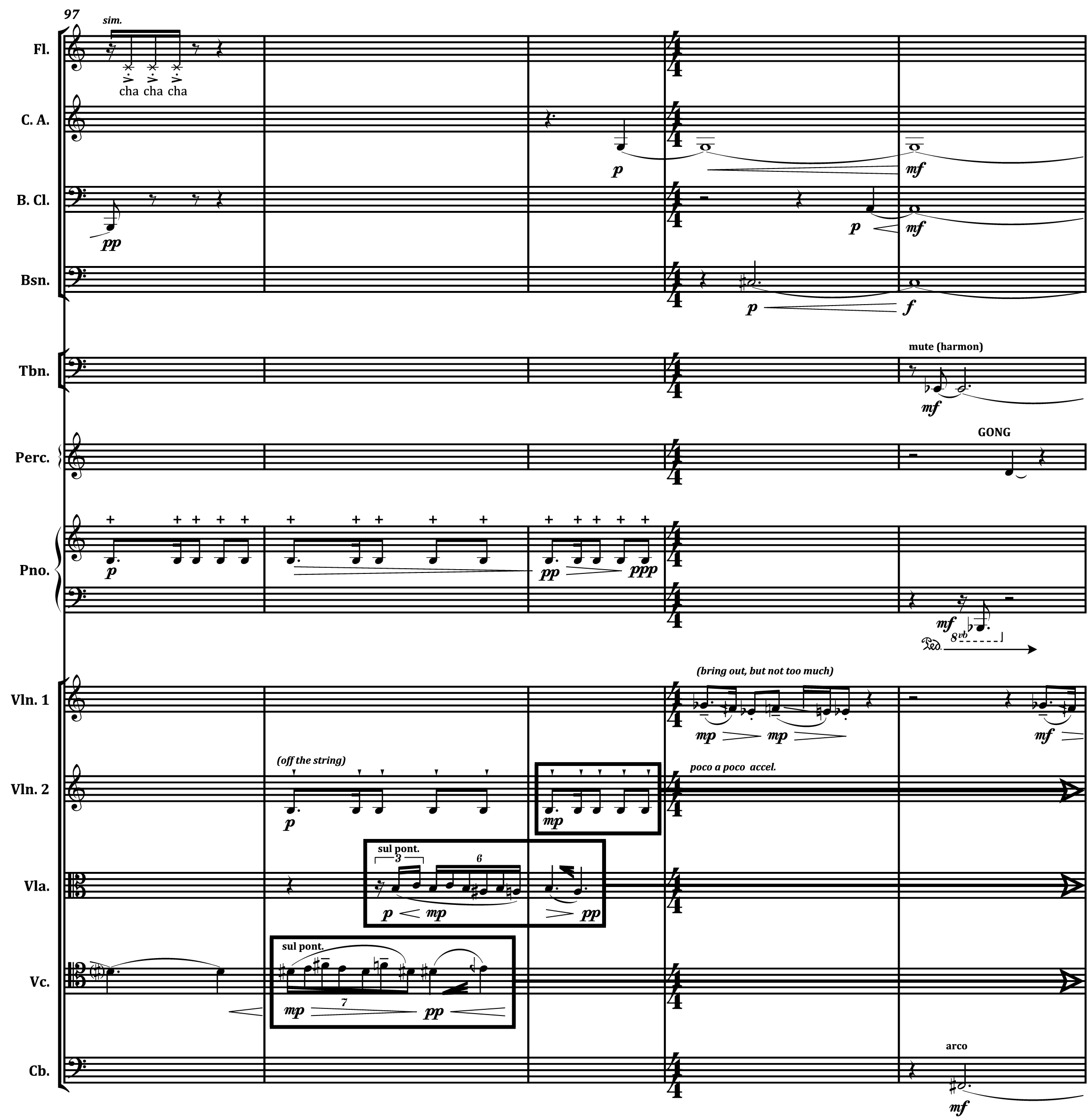

73
77
Fl.
C. A.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
T.
Vln. 1
Vla.
Vc.
Cb.
non vib
to triangle/bass drum
(tender)
arms in the form of my own moth - - er
mute - non vib. - sul D - (change bows freely)
(change bows freely)


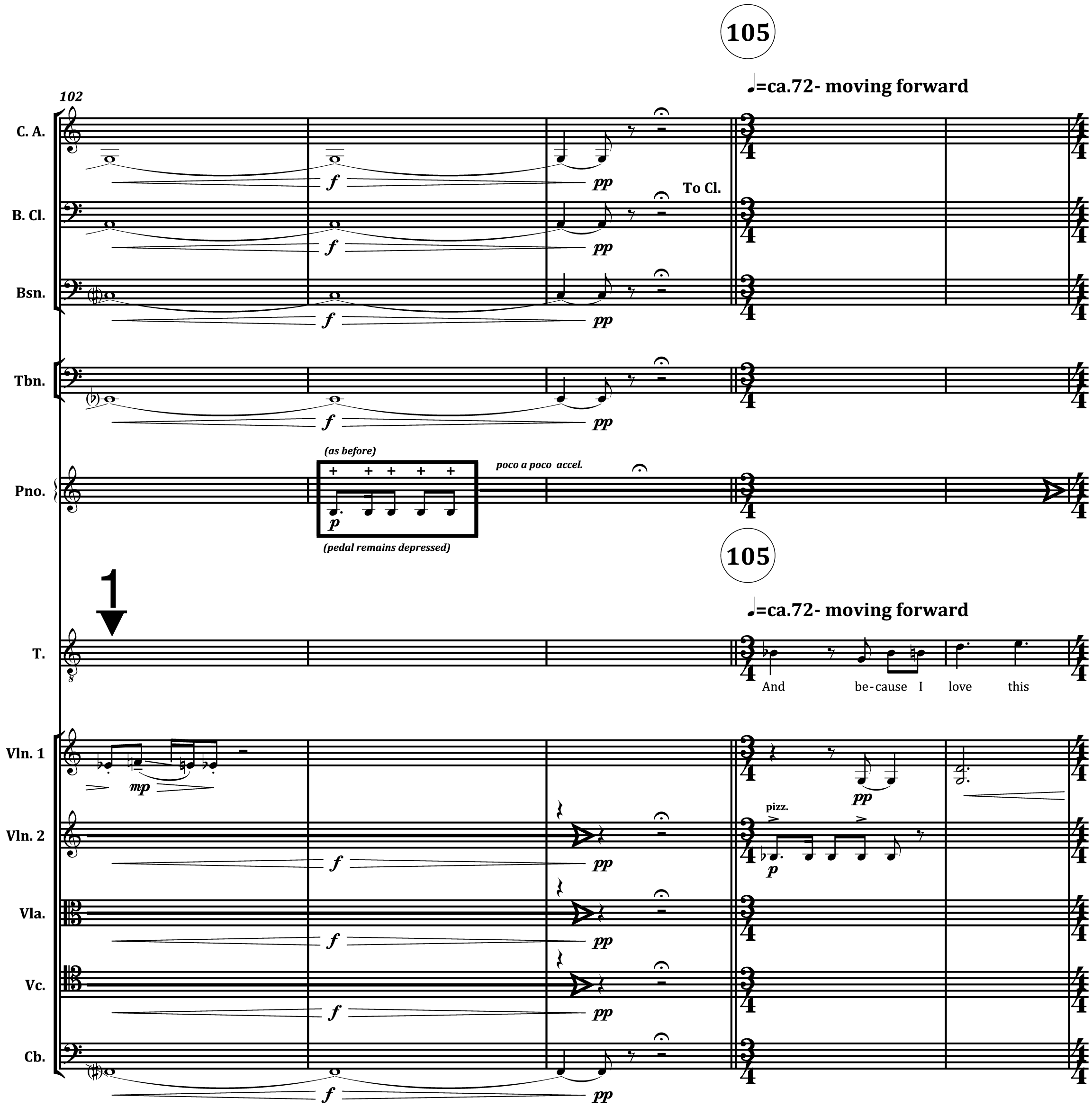
78
Fl.
C. A.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
T.
Vln. 1
Vla.
Vc.
Cb.
non vib.
to contrabass clarinet
non vib
non vib. (harmon)
my own moth - - - - - - er moth - - - er
ord. (sempre non vib.)
1


82
Fl.
C. A.
Cl.
Bsn.
C Tpt.
Tbn.
Pno.
T.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
non vib.
tongue ram
To B. Cl.
poco vib.
(prepare toilet paper roll)
mute (harmon)
(close keyboard)
E-ven so, in death the same
(sempre non vib.)
sul tasto
mute - non vib.
sul G - (windshield wiper effect) *
(s.t.)
(s.p.)


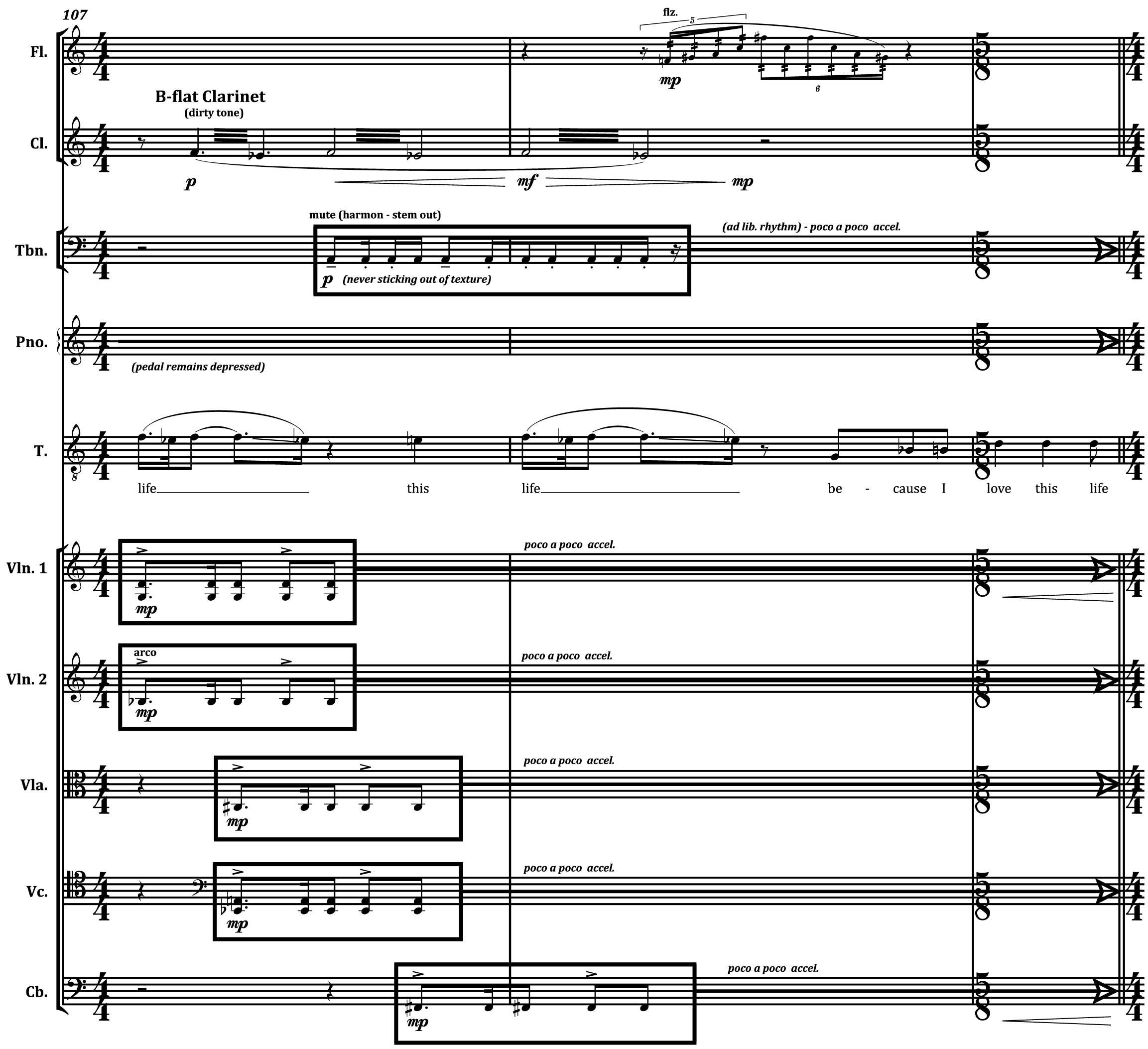
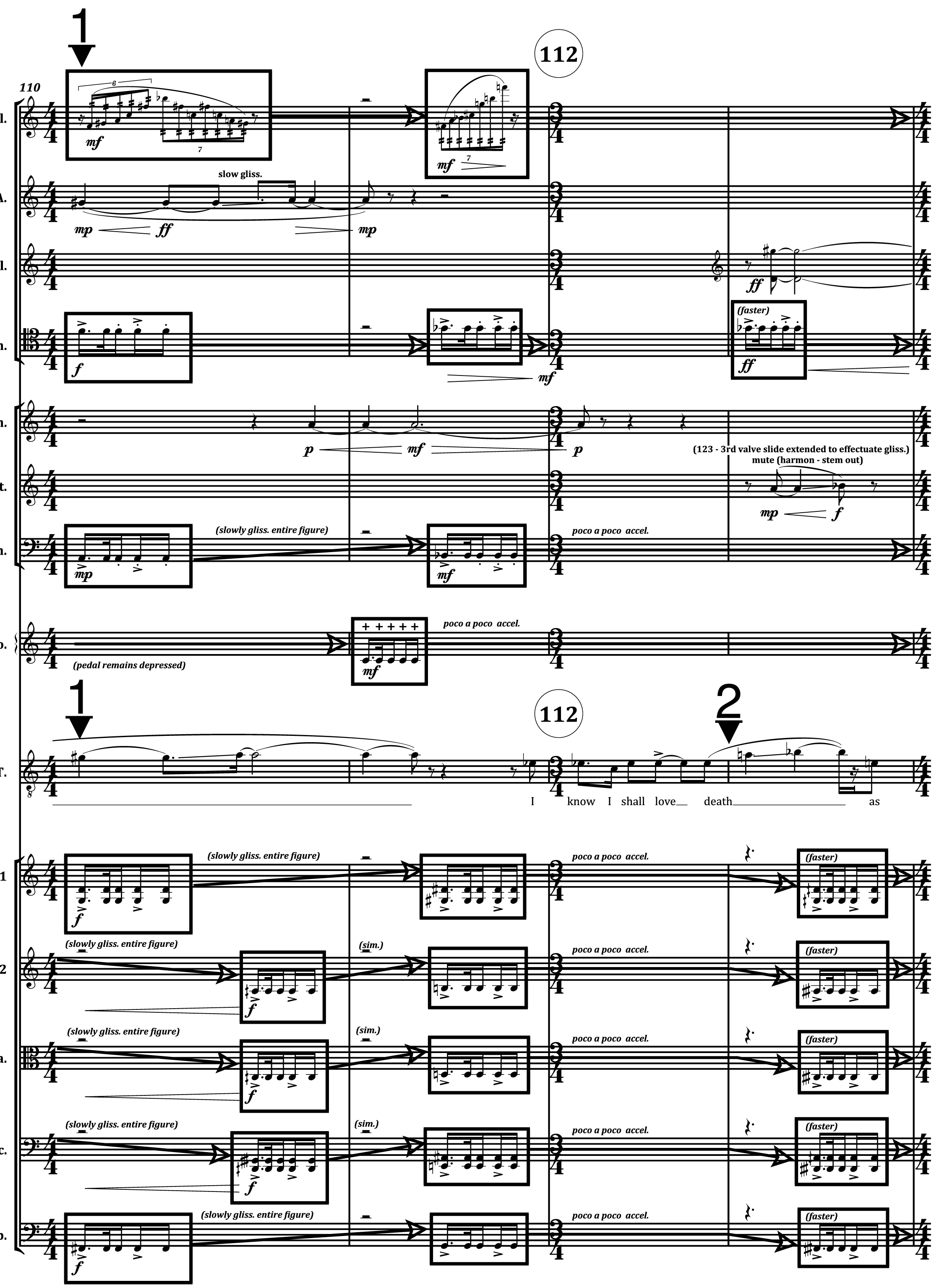
88
♩=ca.46 - slower
86
poco rit.
non vib.
Fl.
C. A.
poco vib.
Cl.
Bass Clarinet in B♭
Bsn.
C Tpt.
(random valve noise)
(flap valves)
Tbn.
(trigger trill)
mute (harmon) - non vib.
Perc.
SMALL TRIANGLE
BASS DRUM
super ball
Pno.
(tap on lid)
(open keyboard)
T.
un - known will ap - pear as ev - er known to me
Vln. 1
mute
Vln. 2
sim.
Vla.
mute - sul A
Vc.
Cb.


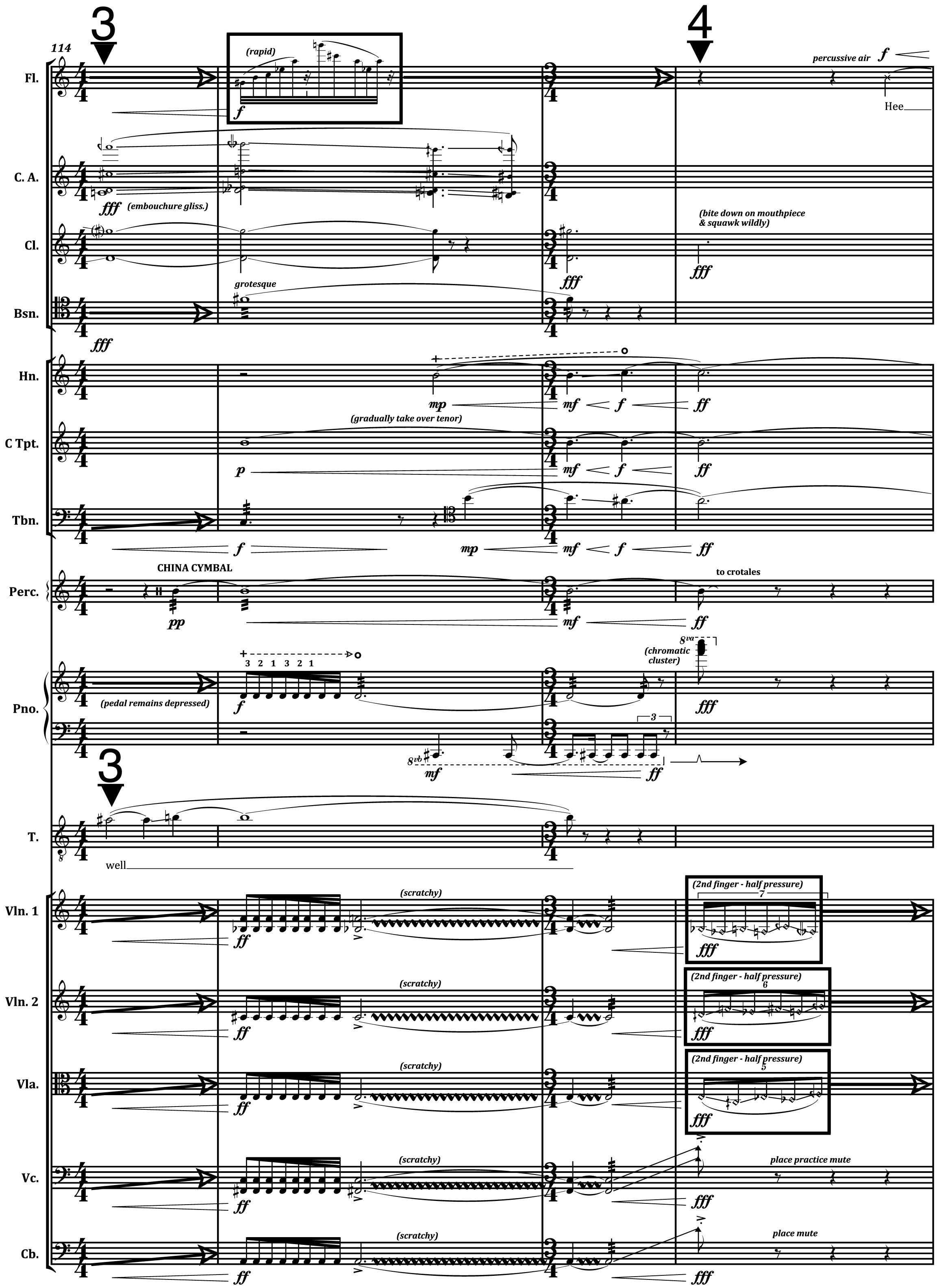
89
sempre non vib.
non vib.
mute
mute (bucket)
TRIANGLE
BASS DRUM
super ball
VIBRAPHONE
(motor off)
pantomime
sing
known to me ev - er known
Fl.
C. A.
B. Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
T.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


95
♩.=ca.60- quiet - laden with mystery
93
Fl.
(percussive air through instrument)
f
cha cha cha
C. A.
B. Cl.
p
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
ppp
to gong
GONG
p
Pno.
mp
T.
sing
to
me
Vln. 1
Vln. 2
Vla.
non vib.
pp
sul pont.
mp
pp
Vc.
non vib.
pp
Cb.
pizz.
mp


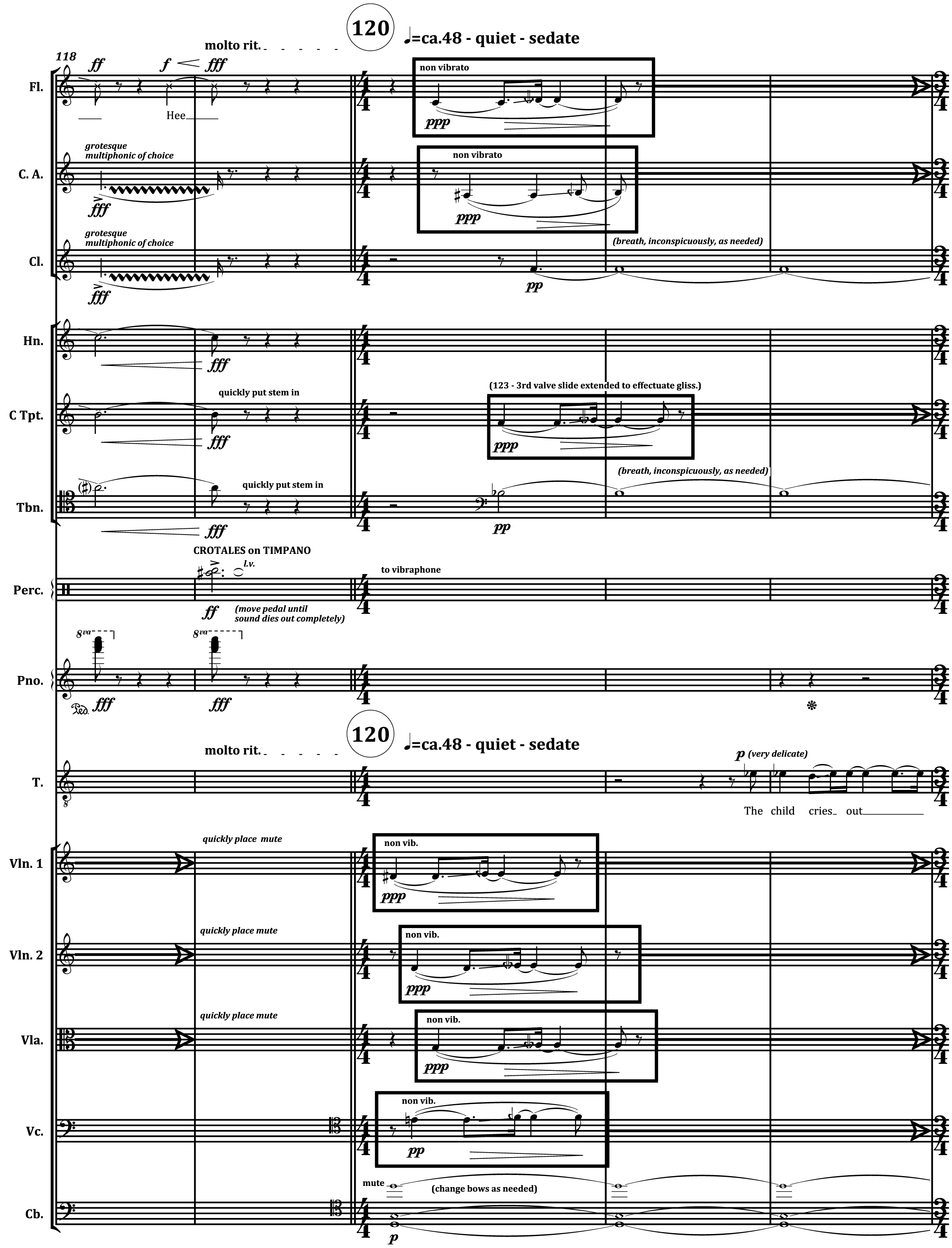
97
Fl.
sim.
cha cha cha
C. A.
B. Cl.
Bsn.
Tbn.
mute (harmon)
Perc.
GONG
Pno.
Vln. 1
(bring out, but not too much)
Vln. 2
(off the string)
poco a poco accel.
Vla.
sul pont.
Vc.
sul pont.
Cb.
arco


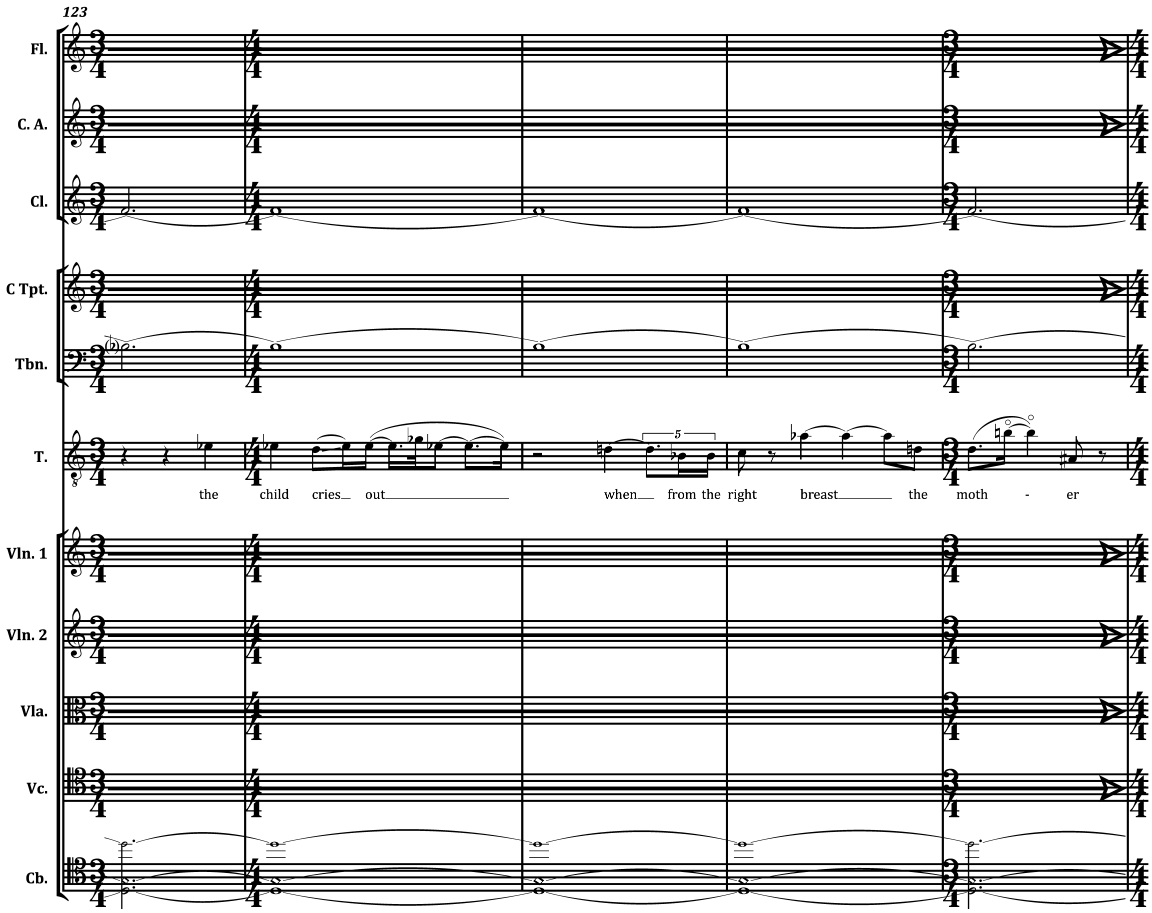
105
♩=ca.72- moving forward
102
C. A.
B. Cl.
Bsn.
Tbn.
Pno.
f
pp
To Cl.
(as before)
poco a poco accel.
p
(pedal remains depressed)
105
♩=ca.72- moving forward
1
T.
And be-cause I love this
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
mp
pizz.

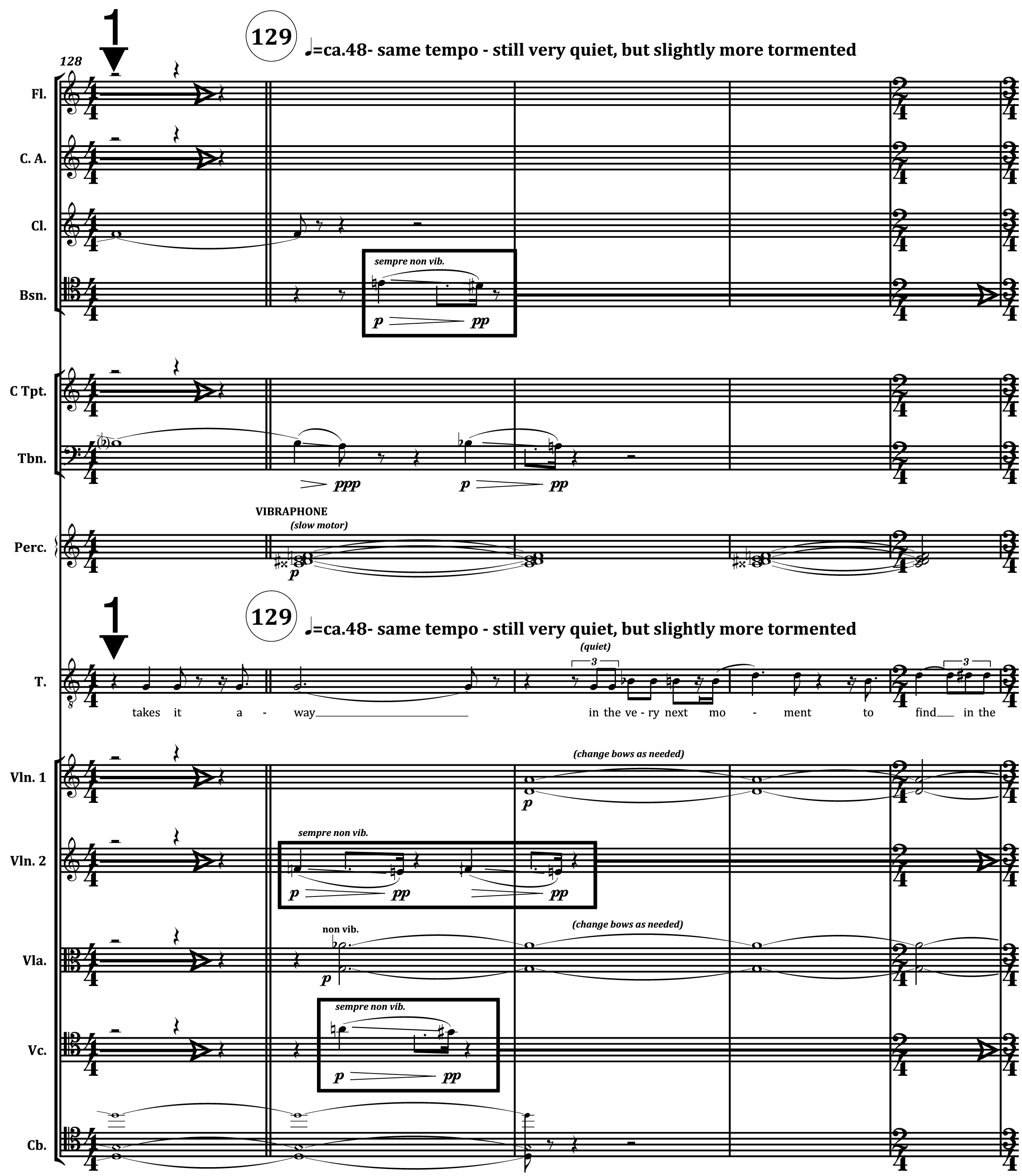

107
Fl.
flz.
5
6
mp
Cl.
B-flat Clarinet
(dirty tone)
p
mf
mp
Tbn.
mute (harmon - stem out)
p (never sticking out of texture)
(ad lib. rhythm) - poco a poco accel.
Pno.
(pedal remains depressed)
T.
life this life be - cause I love this life
Vln. 1
mp
poco a poco accel.
Vln. 2
arco
mp
poco a poco accel.
Vla.
mp
poco a poco accel.
Vc.
mp
poco a poco accel.
Cb.
mp
poco a poco accel.


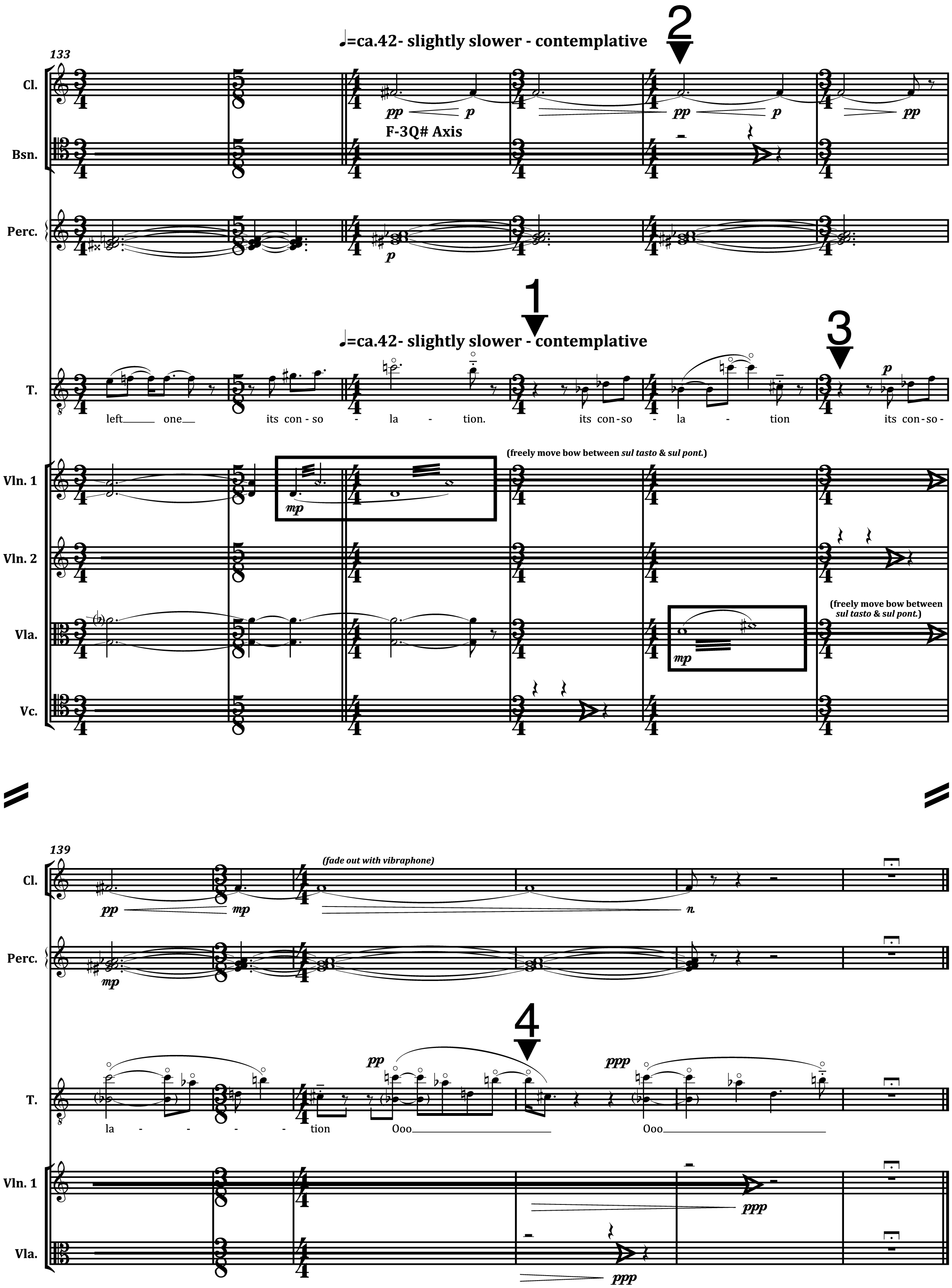
1
112
110
Fl.
C. A.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Pno.
T.
Vln. 1
Vln. 2
Vla.
Vc.
Cb.
slow gliss.
(faster)
(123 - 3rd valve slide extended to effectuate gliss.)
mute (harmon - stem out)
(slowly gliss. entire figure)
poco a poco accel.
(pedal remains depressed)
(sim.)
2
I know I shall love death as


3
114
4
Fl.
(rapid)
percussive air
Hee
C. A.
(embouchure gliss.)
Cl.
(bite down on mouthpiece & squawk wildly)
Bsn.
grotesque
Hn.
C Tpt.
(gradually take over tenor)
Tbn.
Perc.
CHINA CYMBAL
to crotales
Pno.
(pedal remains depressed)
(chromatic cluster)
3
T.
well
Vln. 1
(scratchy)
(2nd finger - half pressure)
Vln. 2
Vla.
Vc.
place practice mute
Cb.
place mute



118
120
molto rit.
♩=ca.48 - quiet - sedate
Fl.
Hee
non vibrato
C. A.
grotesque multiphonic of choice
non vibrato
Cl.
grotesque multiphonic of choice
(breath, inconspicuously, as needed)
Hn.
C Tpt.
quickly put stem in
(123 - 3rd valve slide extended to effectuate gliss.)
Tbn.
quickly put stem in
(breath, inconspicuously, as needed)
CROTALES on TIMPANO
l.v.
Perc.
(move pedal until sound dies out completely)
to vibraphone
Pno.
T.
(very delicate)
The child cries out
Vln. 1
quickly place mute
non vib.
Vln. 2
quickly place mute
non vib.
Vla.
quickly place mute
non vib.
Vc.
non vib.
Cb.
mute
(change bows as needed)


123
Fl.
C. A.
Cl.
C Tpt.
Tbn.
T.
the child cries out when from the right breast the moth - er
Vln. 1
Vln. 2
Vla.
Vc.
Cb.


1
128
129
♩=ca.48- same tempo - still very quiet, but slightly more tormented
Fl.
C. A.
Cl.
Bsn.
sempre non vib.
C Tpt.
Tbn.
VIBRAPHONE
(slow motor)
Perc.
1
129
♩=ca.48- same tempo - still very quiet, but slightly more tormented
(quiet)
T.
takes it a - way in the ve - ry next mo - ment to find in the
Vln. 1
(change bows as needed)
Vln. 2
sempre non vib.
Vla.
non vib.
(change bows as needed)
Vc.
sempre non vib.
Cb.

1 February 2012
Ithaca, NY

HARMONIES POETIQUES ET RELIGIEUSES

Jesse Jones
(2011)

Written for mezzo-soprano Rachel Calloway and the Argento Chamber Ensemble

Winner of the Heckscher Foundation Prize in Composition

Ithaca College, 2011

HARMONIES POETIQUES ET RELIGIEUSES*

Jesse Jones

INSTRUMENTATION

Flute (doubling piccolo, alto, and bass flute)

B-flat Clarinet (doubling bass clarinet)

Piano (resonance only)**

Solo Mezzo-Soprano

Violin

Violoncello

Duration: ca. 22 minutes

* A body of poems by Alphonse de Lamartine (public domain), from which the texts for this piece were chosen.

** The piano lid should be propped open and the bench placed on the pedal so as to allow pitches from the ensemble to resonate sympathetically in the strings. No player is needed.

PERFORMANCE DIRECTIONS

Solo Mezzo Soprano

Text (translated here by the composer):

1. Prologue

Il y a des âmes méditatives que la solitude et la contemplation élèvent invinciblement vers les idées infinies, c'est-à-dire vers la religion; toutes leurs pensées se convertissent en enthousiasme et en prière, toute leur existence est un hymne muet à la Divinité et à l'espérance. Elles cherchent en elles-mêmes et dans la création qui les environne des degrés pour monter à Dieu, des expressions et des images pour se le révéler â elles-mêmes, pour se révéler à lui: puissé-je leur en prêter quelques-unes!

There are meditative souls who are elevated ineluctably by solitude and contemplation toward infinite ideas, that is, toward religion; all their thoughts are converted into rapture and into prayer, all their existence is a mute hymn to the Divinity and to hope. They seek in themselves and in the creation that surrounds them steps by which to ascend to God, expressions and images that will reveal Him to themselves and themselves to him: may it be granted me to impart something similar!

2. Tombez larmes

Tombez, larmes silencieuses,
Sur une terre sans pitié;
Non plus entre des mains pieuses,
Ni sur le sein de l'amitié!

Tombez comme une arid pluie
Qui rejaillit sur le rocher,
Que nul rayon du ciel n'essuie,
Que nul souffle ne vient secher.

Fall, silent tears,
On a soil without pity,
No more between pious hands,
Nor on the bosom of friendship!

Fall like an arid rain
That splashes on the rock,
Which no beam from heaven evaporates,
Which no breeze comes to dry

3. Instrumental Interlude

4. D'où me vient cette paix?

D'où me vient, ô mon Dieu, cette piax qui m'inonde?
D'où me vient, cette foi don't mon coeur surabonde,
A moi qui tout à l'heure, incertain, agité,
Et sur les flots du doute à tout vent ballotté,
Cherchais le bien, le vrai, dans les rêves des sages,
Et la paix dans des coeurs retentissant d'orages?
A peine sur mon front quelques jours ont glissé,
Il me semble qu'un siècle et qu'un monde ont passé,
Et que, séparé d'eux par une abîme immense,
Un nouvel homme en moi renaît et recommence.

Whence comes, O God, this peace which floods over me?
Whence comes this faith with which my heart overflows?
To me who, not long ago, uncertain, restless,
And tossed on waves of doubt by every wind,
Sought the good, the true, in the dreams of worldly sages,
And peace in hearts resounding with tempests?
Scarcely have a few days brushed past my brow,
And it seems that a century and a world have passed away,
And that, separated from them by an immense abyss,
A new man is reborn and begins again in me.

5. Instrumental Interlude

6. Voix de mon âme

Élevez-vous, voix de mon âme
Avec l'aurore, avec la nuit!
Élancez-vous come la flame,
Répandez-vous, comme le bruit!
Flottez sur l'aile des nuages,
Mêlez-vous aux vents, aux orages,
Au tonnerre, au fracas des flots!

Élevez-vous dans le silance,
A l'heure où dans l'ombre du soir
La lampe des nuits se balance,
Quand le prêtre étient l'encensoir!
Élevez-vous aux bords des ondes
Dans les solitudes profondes,
Où Dieu se révèle à la foi

Rise, voice of my soul,
With the dawn, with the night!
Leap forth like the flame,
Scatter like sound!
Float on the clouds' wing,
Mingle in the winds, in the storms,
In the thunder, in the roar of the waves!

Rise in the silence,
When in the shadow of evening
The night lamp swings,
When the priest extinguishes the censer!
Rise to the edge of the waters
In the profound solitudes,
Where God reveals himself to faith!

7. Epilogue

Il y a des coeurs brisés par la douleur, refoulés par le monde, qui se réfugient dans le monde de leurs pensées, dans la solitude de leur âme pour pleurer, pour attendre ou pour adorer; puissant-ils se laisser visiter par une Muse solitaire comme eux, trouver une sympathie dans ses accords, et dire quelquefois en l'écoutant: nous prions avec tes paroles, nous pleurons avec tes larmes, nous invoquons avec tes chants.

There are hearts broken by grief, trampled down by the world, that seek refuge in the world of their thoughts, in the solitude of their soul, to weep, to wait, or to worship; may they consent to be visited by a muse as solitary as they, find a sympathetic resonance in her chords, and sometimes say while listening to her: We pray with your words, we weep with your tears, we entreat with your songs!

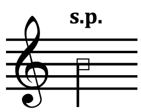
ADDITIONAL PERFORMANCE DIRECTIONS

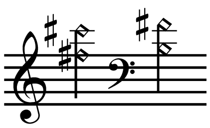
Strings

Q s.p. = (quasi sul pont.) - play close to bridge

Q s.t. = (quasi sul tasto.) - play just close enough to fingerboard to noticeably change tone

= Press string down on given pitch just enough to avoid natural harmonics. A very quiet, whispery pitch, laden with overtones, should result.



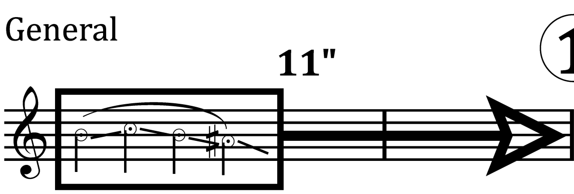
= Square noteheads indicate playing completely on the bridge. No pitch should be heard, only the breathy whitenoise associated with drawing the bow on wood. Player should finger given pitch incase bow slides accidentally from bridge onto string.

= All harmonics written at the node where they are to be played (not necessarily at sounding pitch).

Scordatura = The D-string of the violin should be tuned down to "B."
The C-string of the cello should be tuned down to "B-flat."
(At pitch in score. Transposed in parts)

Woodwinds

= Steadily breathe through instrument while fingering given pitch.

General



= Repeat boxed figure ad libitum until cue. If conducted, the conductor should hold up an appropriate number of fingers (one, in this instance) to cue players <u>out</u> of ad libitum sections.

In movements 3 & 5 (the interludes), all vocalising should match the timbre of the instrumental ensemble as much as possible.

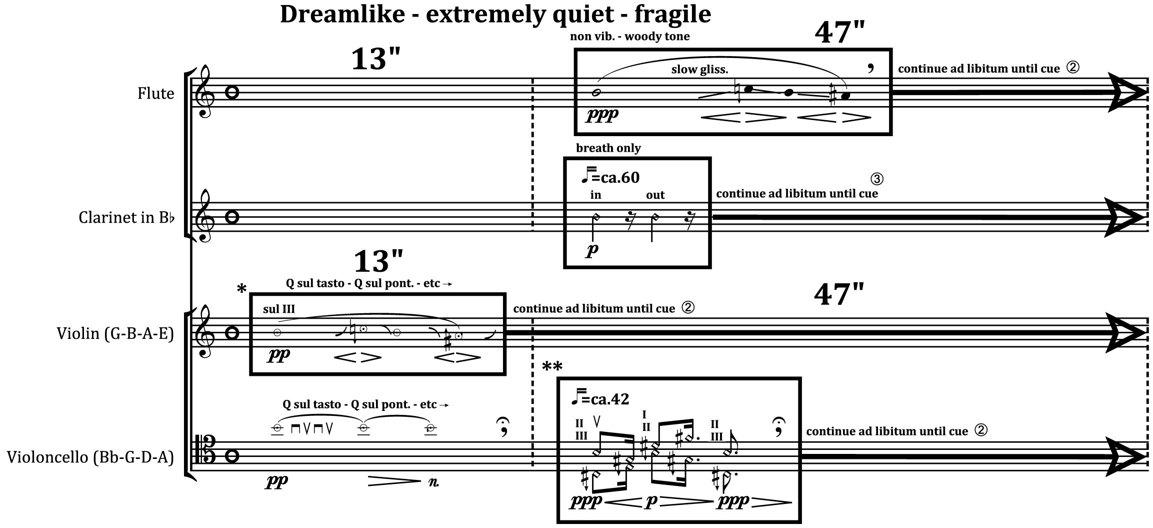
HARMONIES POETIQUES ET RELIGIEUSES

Alphonse de Lamartine

Jesse Jones

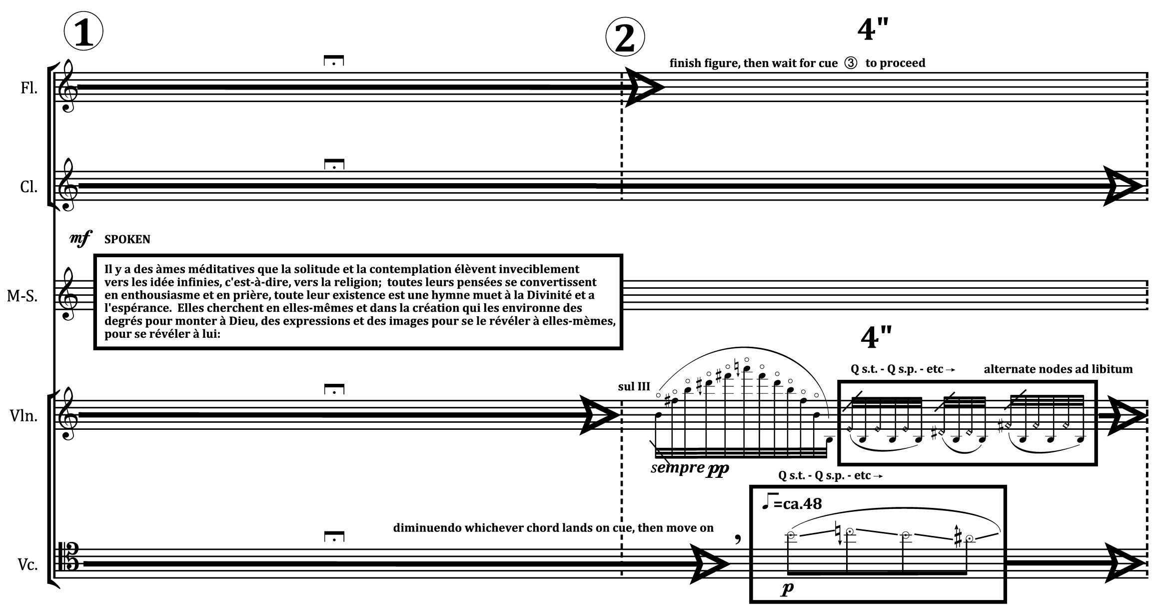
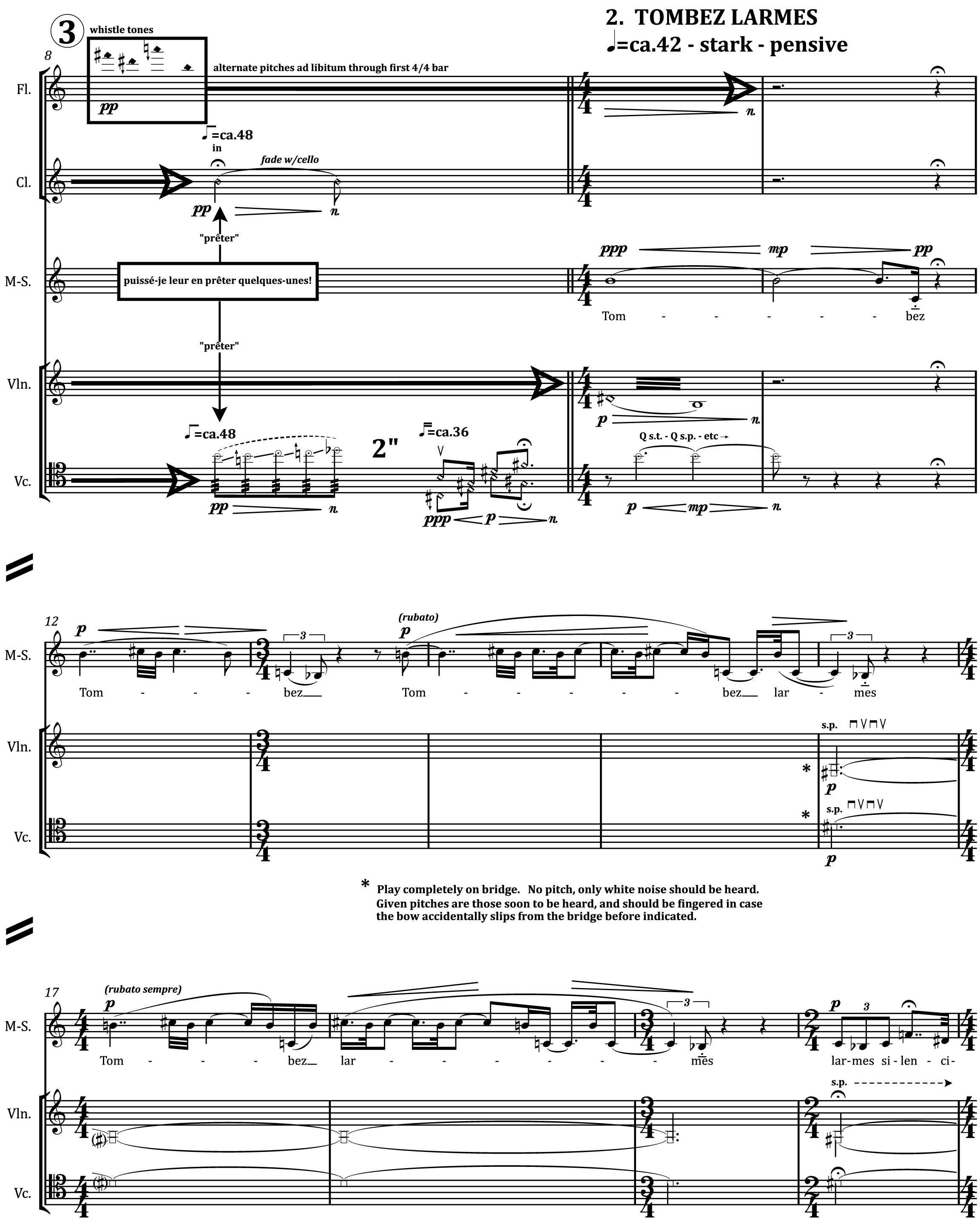
1. PROLOGUE

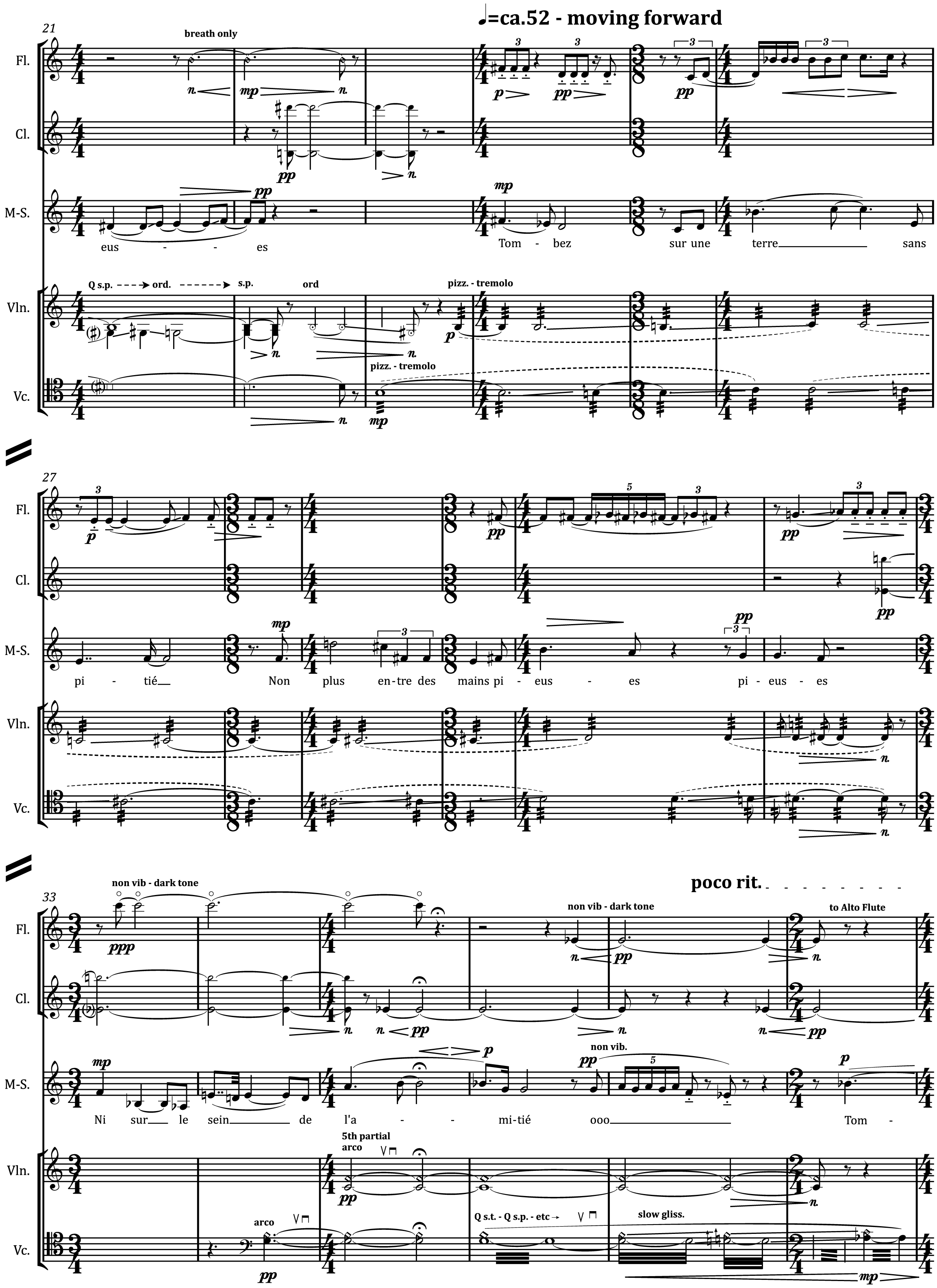
Dreamlike - extremely quiet - fragile

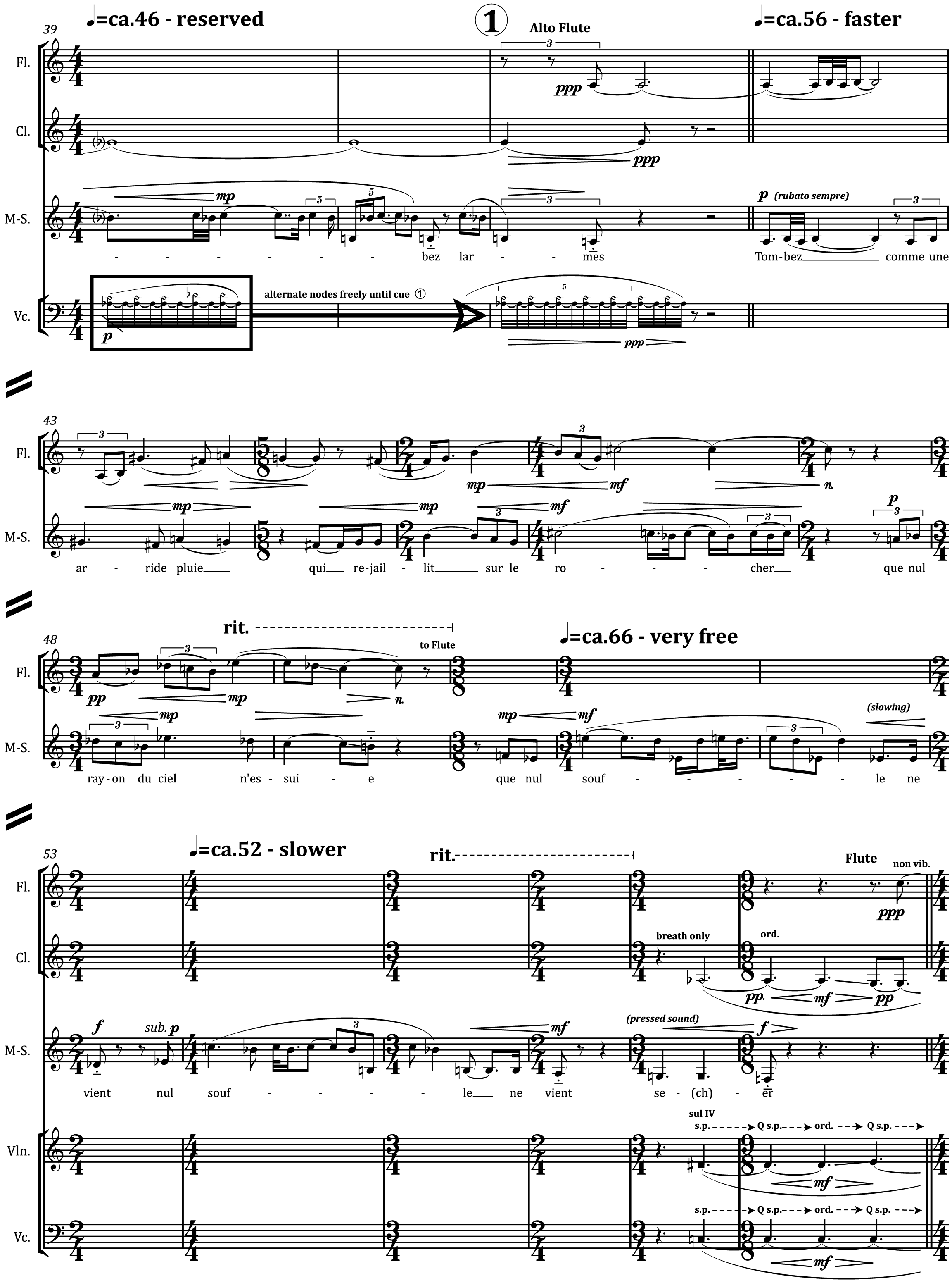


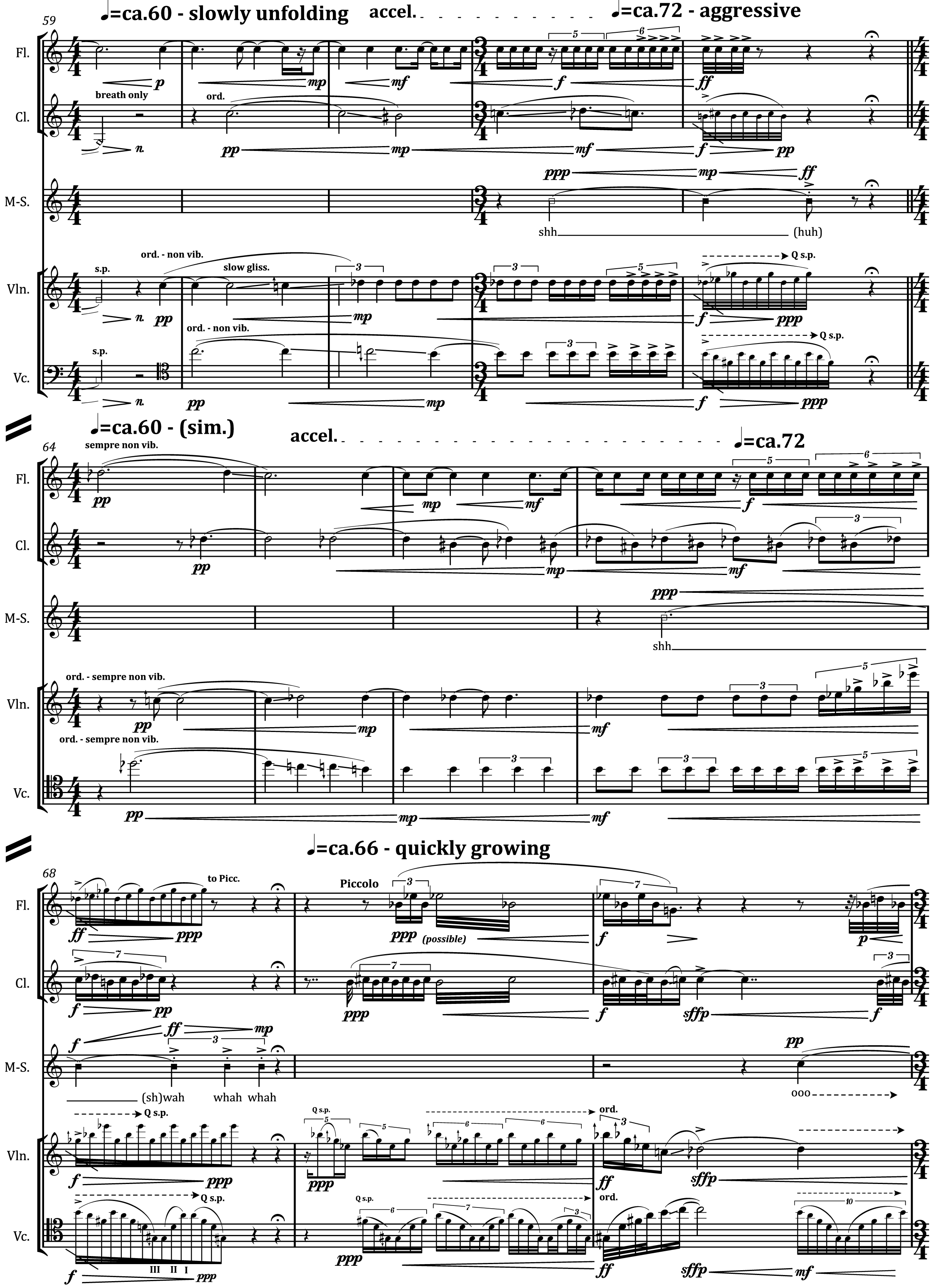
* IIIrd string tuned down to B. Finger on 2nd partial node should be pressed down more than usual so as to avoid full resonance. To acheive quartertones, gradually roll finger in appropriate direction.

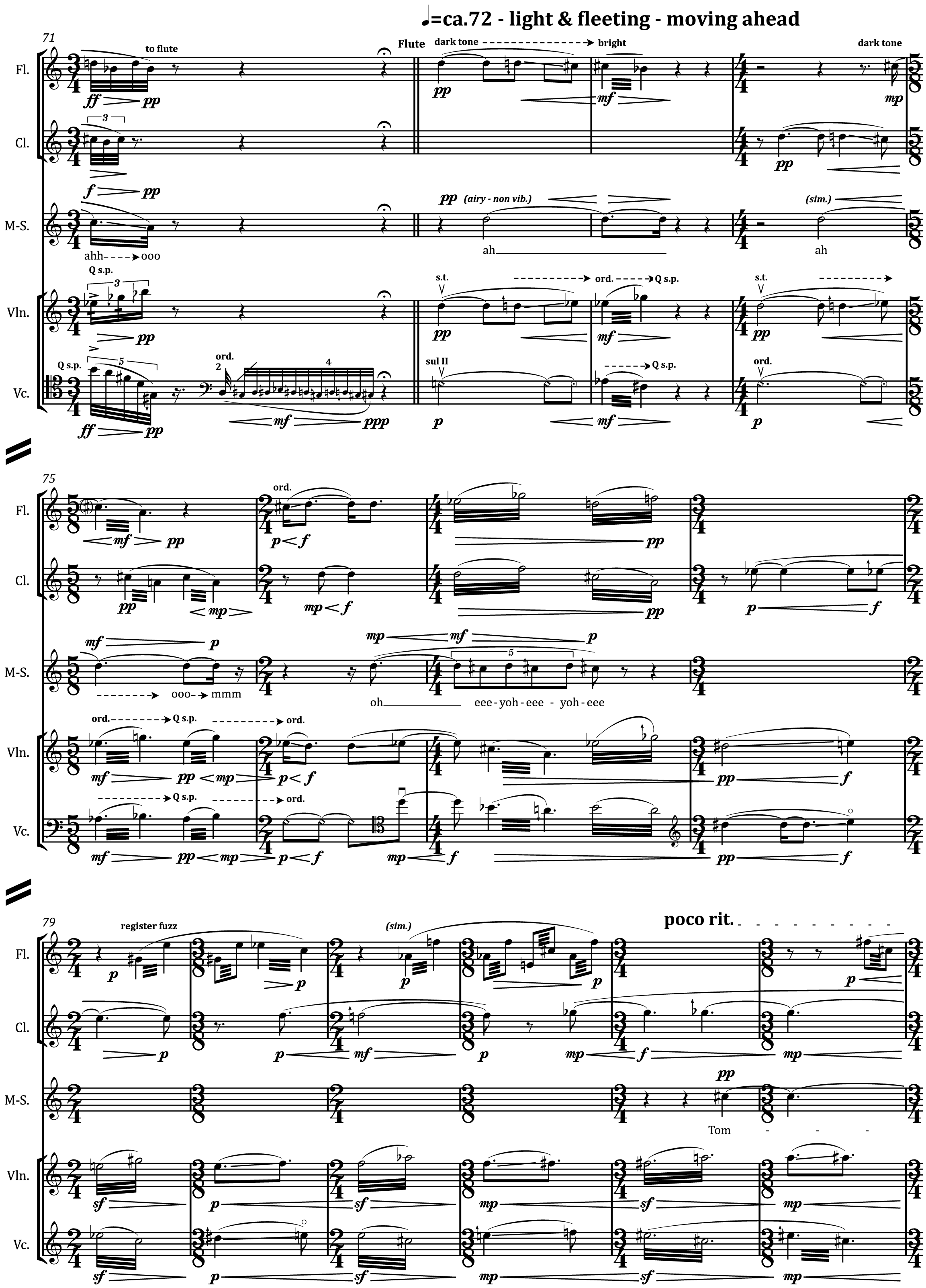
** Natural harmonics on 5th and 7th partials. For best results, bow approximately one inch from bridge, maintaining a fair amount of pressure and bow speed. All scratchy and hissy sounds associated with these nodes are desirable.



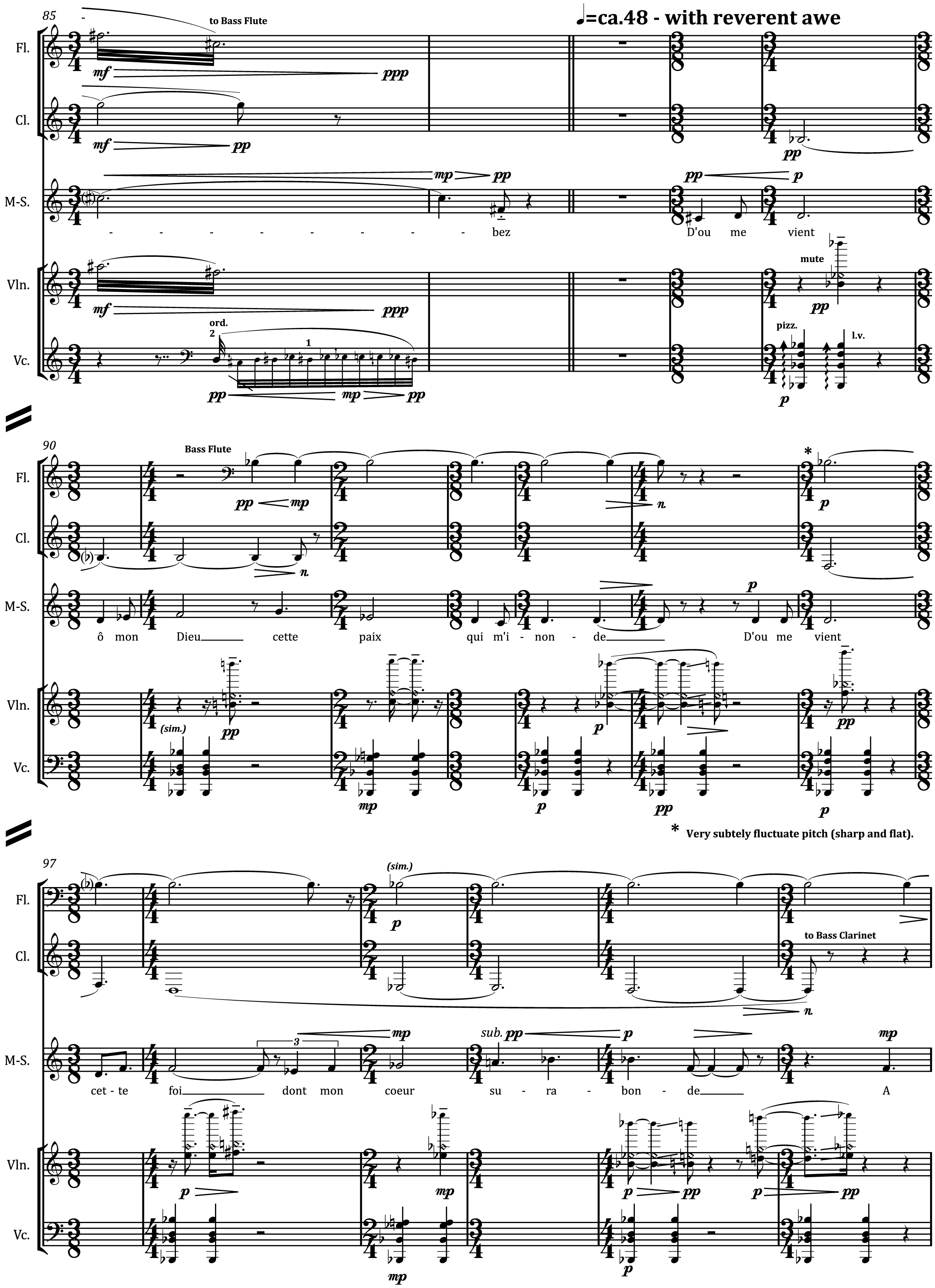
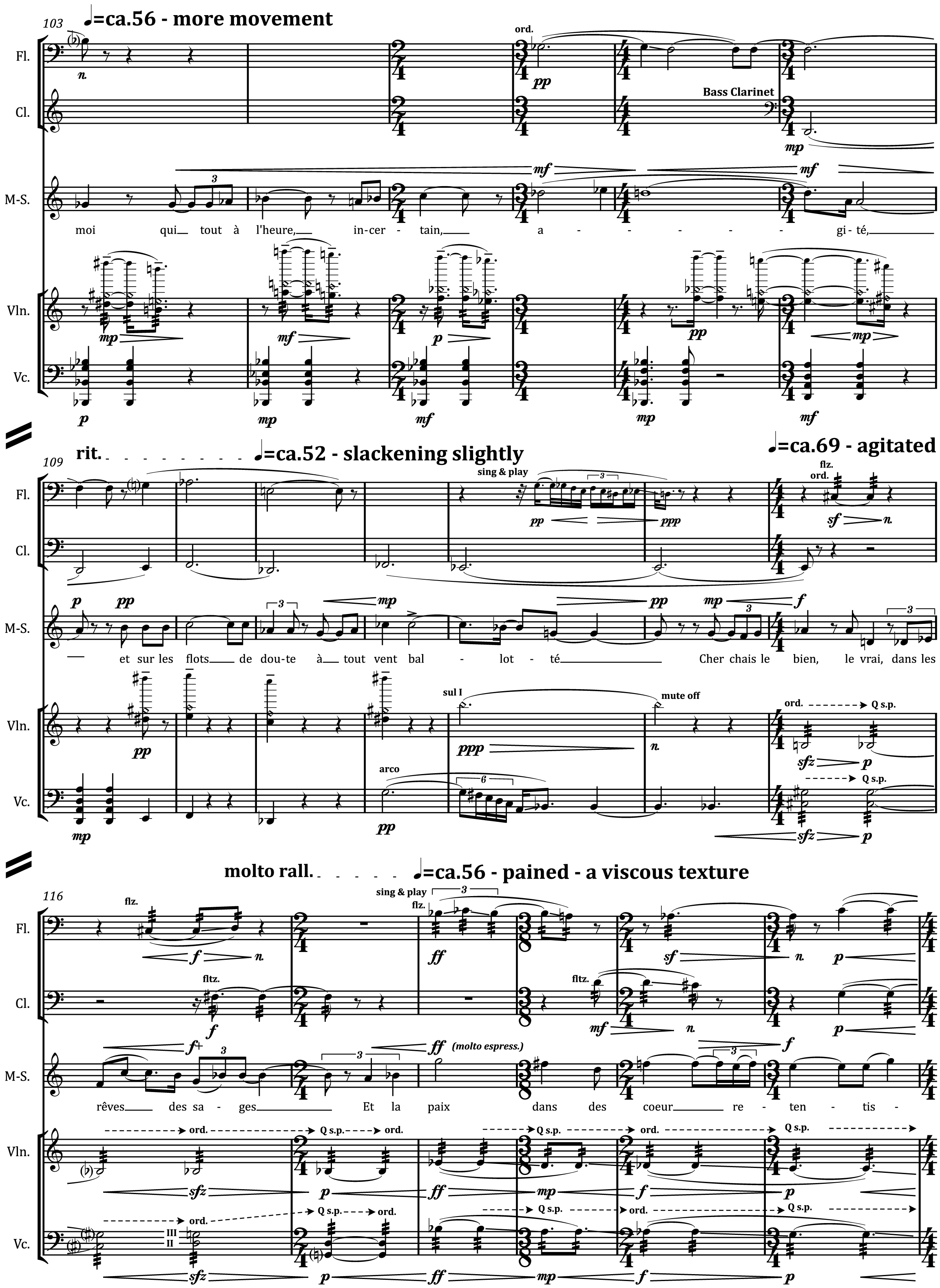

2. TOMBEZ LARMES
♩=ca.42 - stark - pensive
3
whistle tones
alternate pitches ad libitum through first 4/4 bar
Fl.
Cl.
M-S.
Vln.
Vc.
♪=ca.48
in
fade w/cello
"prêter"
puissé-je leur en prêter quelques-unes!
"prêter"
♪=ca.48
2"
♪=ca.36
Q s.t. - Q s.p. - etc →
Tom - - - - - - bez
(rubato)
Tom - - - bez
Tom - - - - - - bez lar - mes
s.p.
* Play completely on bridge. No pitch, only white noise should be heard.
Given pitches are those soon to be heard, and should be fingered in case
the bow accidentally slips from the bridge before indicated.
(rubato sempre)
Tom - - - - bez lar - - - - - - - - mes
lar-mes si-len - ci-
s.p.


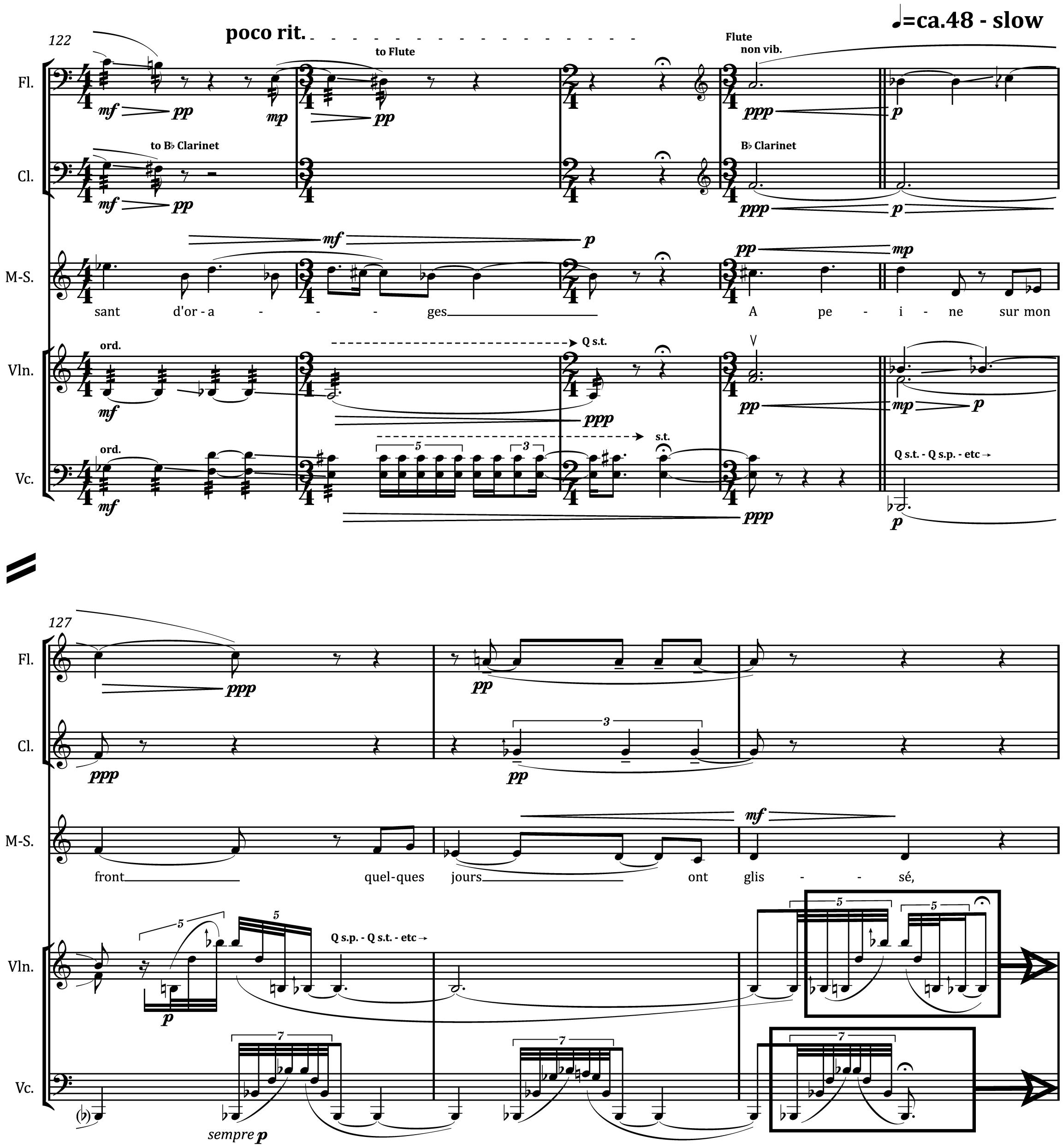
♩=ca.52 - moving forward
breath only
Fl.
Cl.
M-S.
eus - - es
Tom - bez
sur une
terre sans
Vln.
Q s.p. ord. s.p. ord
pizz. - tremolo
Vc.
pizz. - tremolo
pi - tié
Non plus en-tre des mains pi - eus - es pi - eus - es
non vib - dark tone
poco rit.
to Alto Flute
non vib.
Ni sur le sein de l'a - - mi-tié ooo
Tom -
5th partial
arco
Q s.t. - Q s.p. - etc
slow gliss.

39
♩=ca.46 - reserved
1
Alto Flute
♩=ca.56 - faster
Fl.
Cl.
M-S.
Vc.
p (rubato sempre)
bez lar - mes
Tom-bez comme une
alternate nodes freely until cue ①
43
ar - ride pluie qui re-jail - lit sur le ro - cher que nul
48
rit.
to Flute
♩=ca.66 - very free
(slowing)
ray-on du ciel n'es - sui - e que nul souf - le ne
53
♩=ca.52 - slower
rit.
Flute
non vib.
breath only
ord.
sub. p
(pressed sound)
vient nul souf - le ne vient se - (ch) - er
Vln.
sul IV
s.p.
Q s.p.
ord.

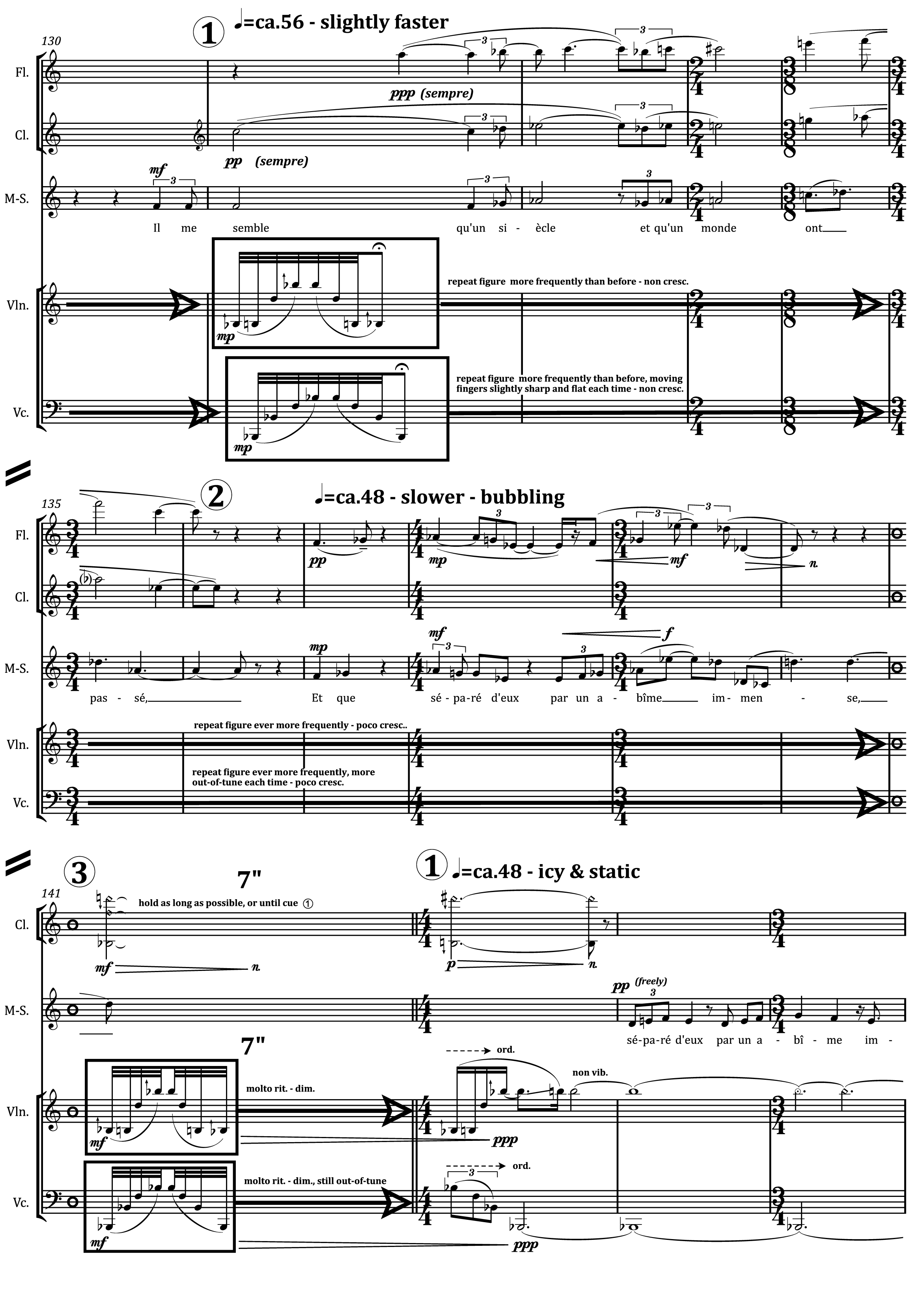
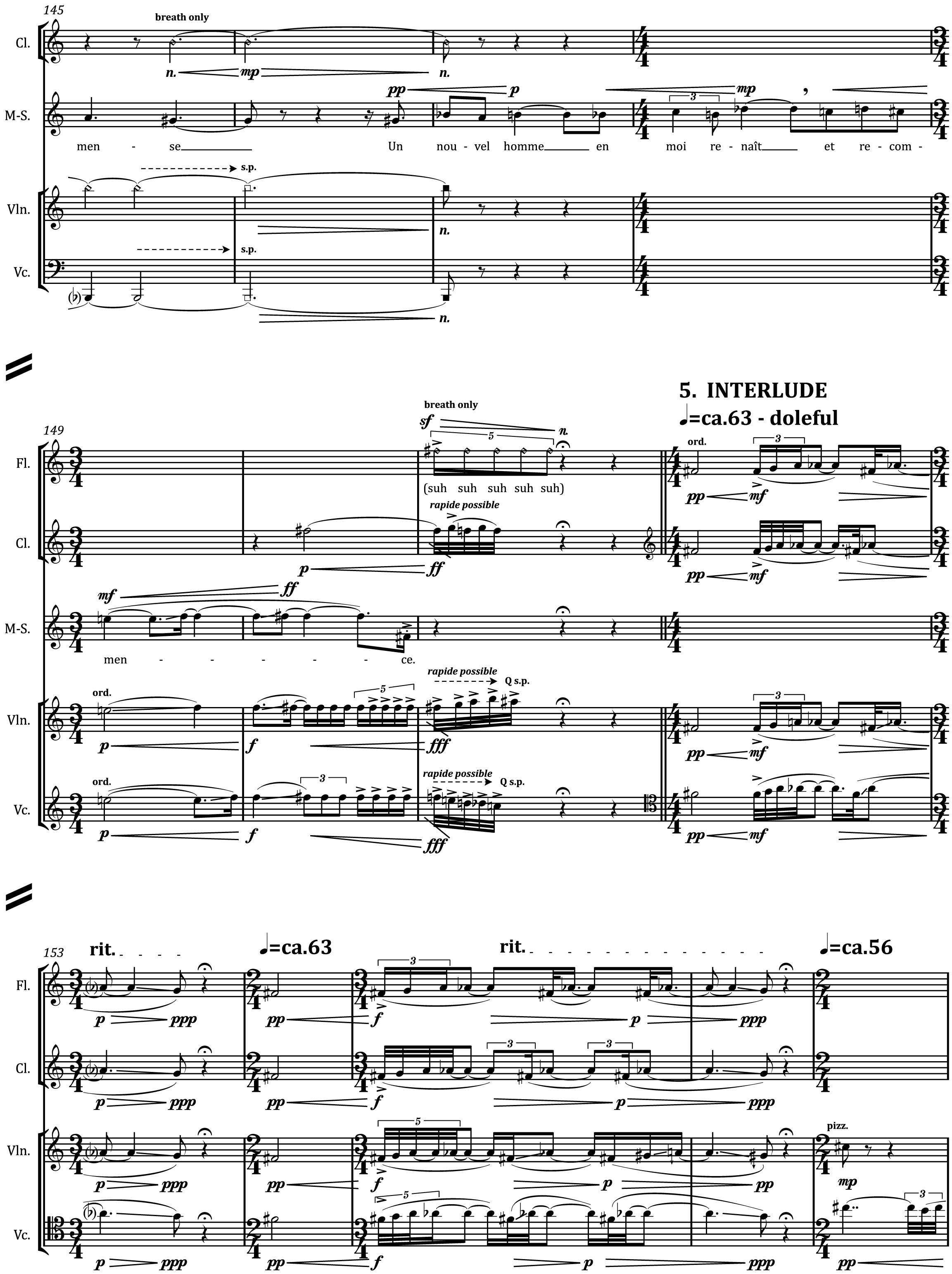
3. INTERLUDE


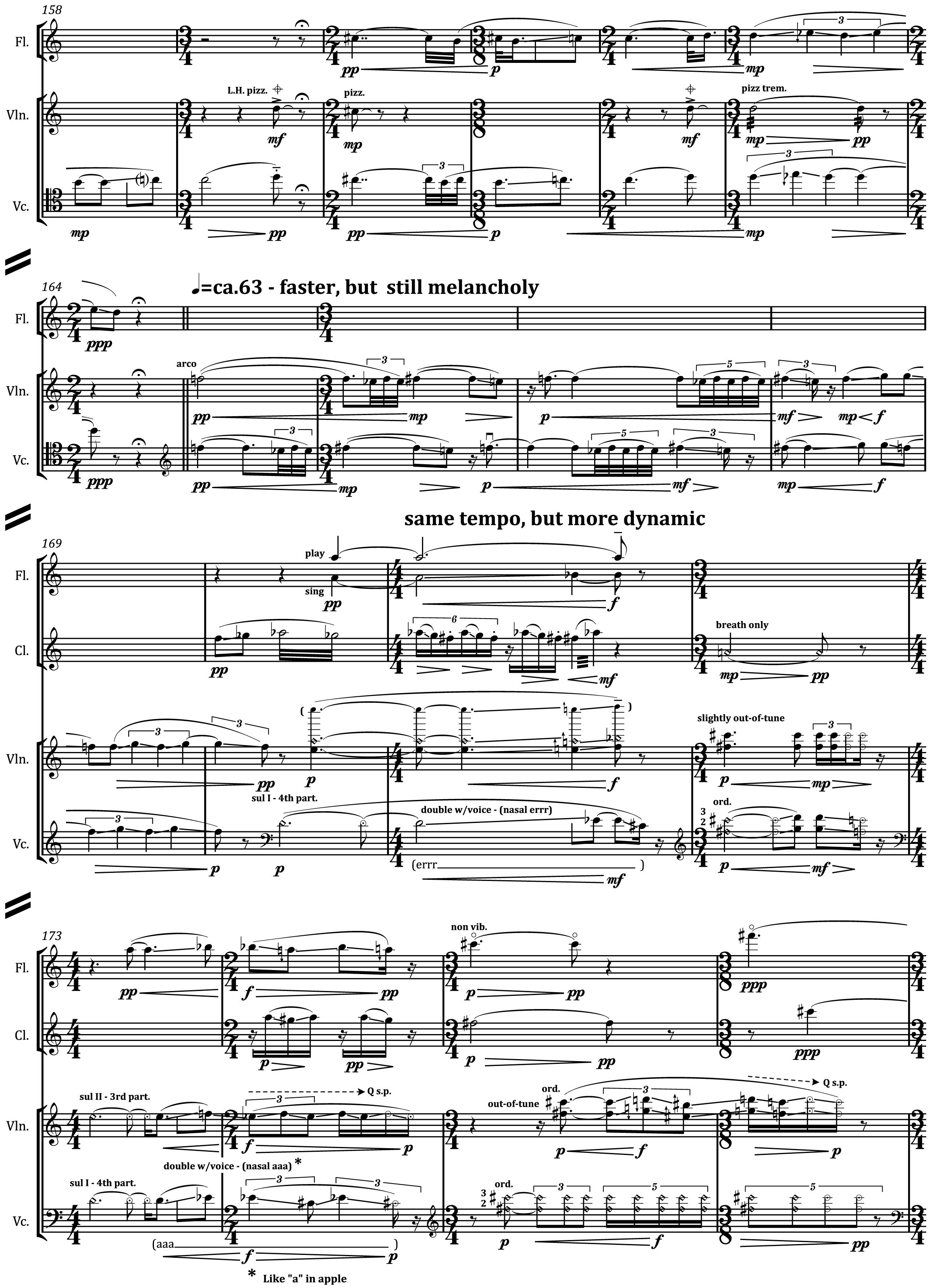
♩=ca.60 - slowly unfolding
accel.
♩=ca.72 - aggressive
Fl.
Cl.
M-S.
Vln.
Vc.
breath only
ord.
shh
(huh)
ord. - non vib.
s.p.
slow gliss.
Q s.p.
♩=ca.60 - (sim.)
accel.
♩=ca.72
sempre non vib.
ord. - sempre non vib.
♩=ca.66 - quickly growing
to Picc.
Piccolo
(possible)
(sh)wah
whah
whah
ooo
ord.
III
II
I

♩=ca.72 - light & fleeting - moving ahead
Fl.
Cl.
M-S.
Vln.
Vc.
to flute
Flute
dark tone
bright
Q s.p.
ord.
s.t.
sul II
(airy - non vib.)
(sim.)
ahh----→ooo
ah
ooo-→mmm
oh
eee-yoh-eee - yoh-eee
register fuzz
poco rit.
Tom

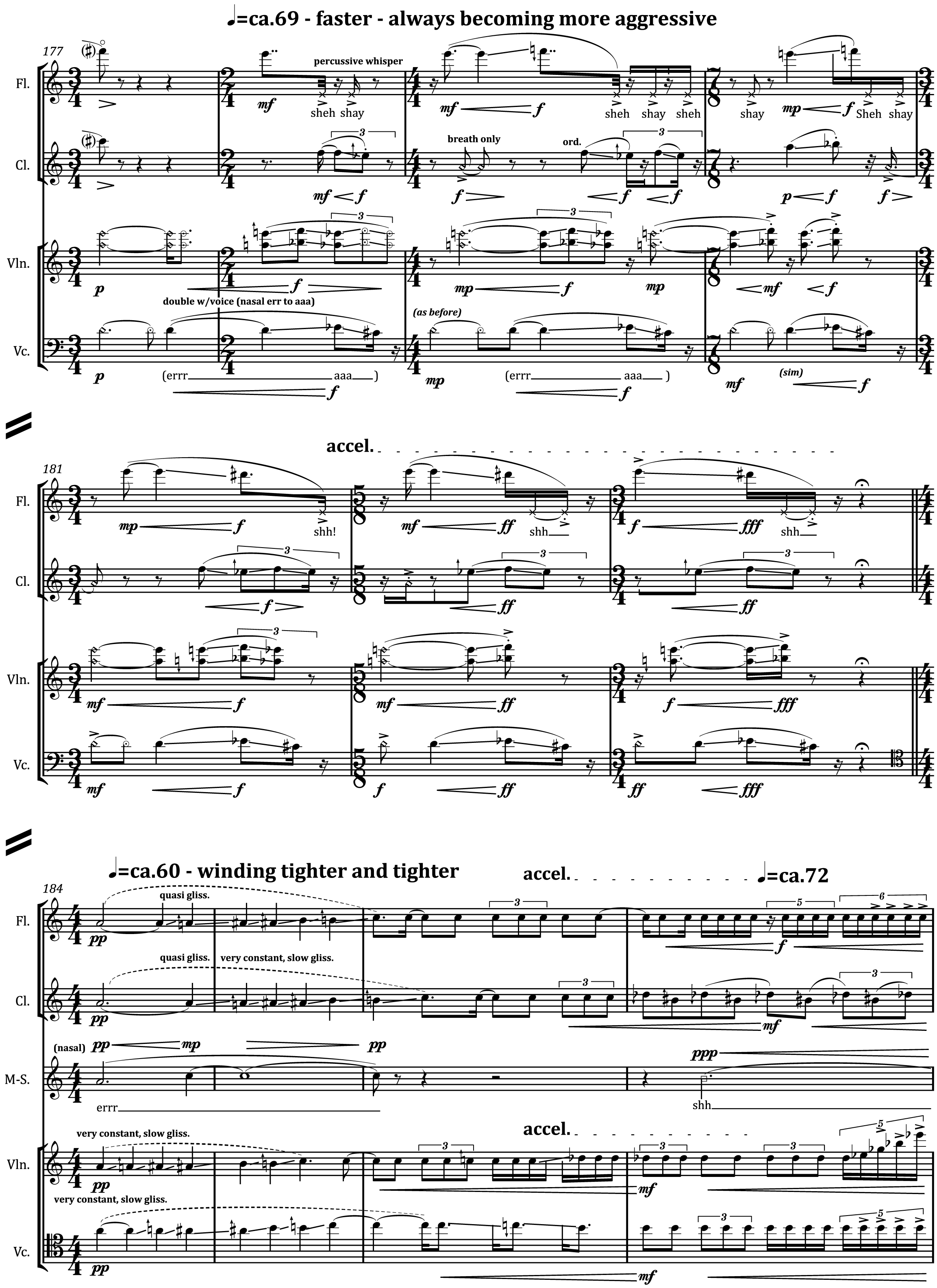
4. D'OU ME VIENT CETTE PAIX?

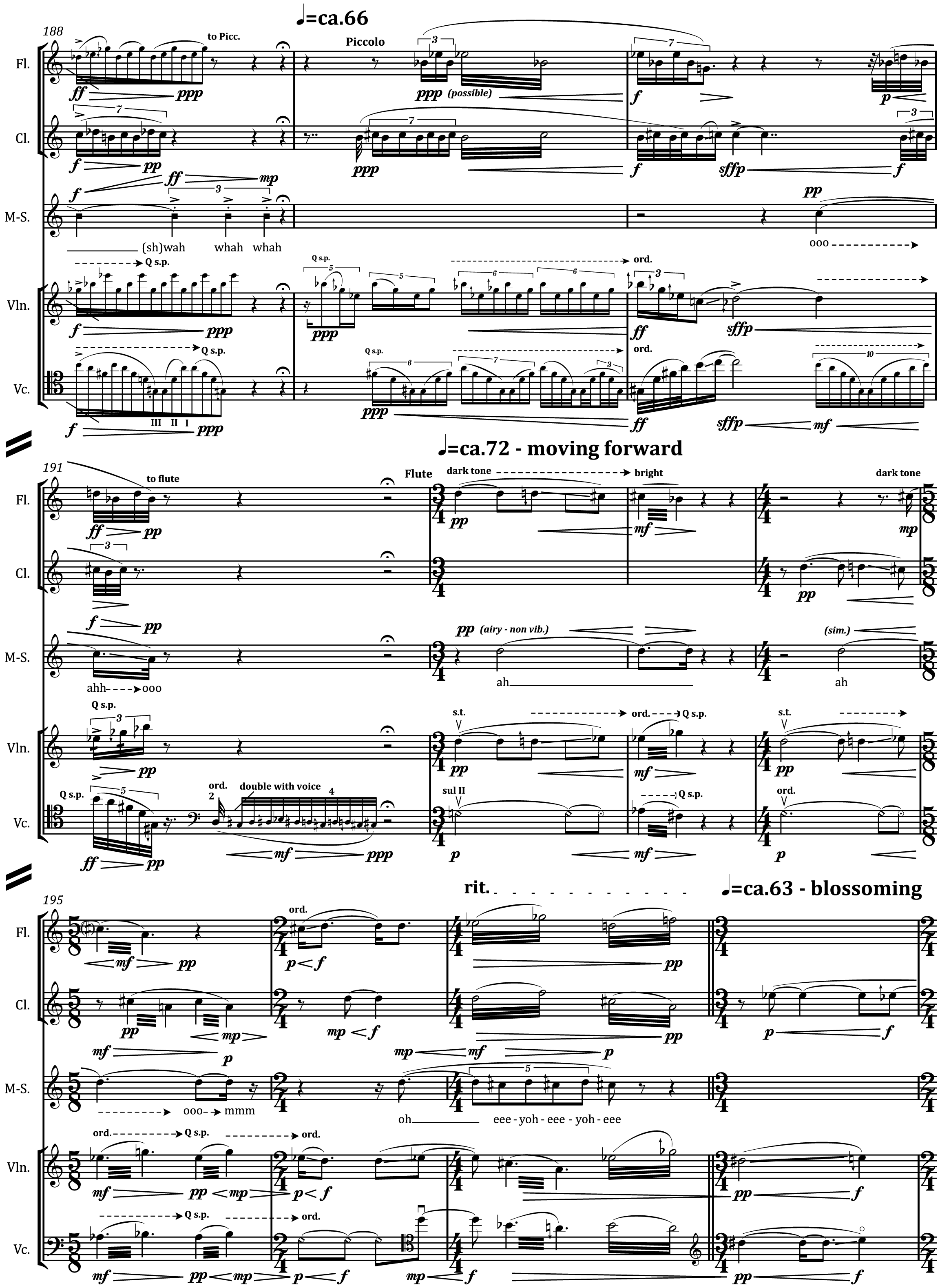
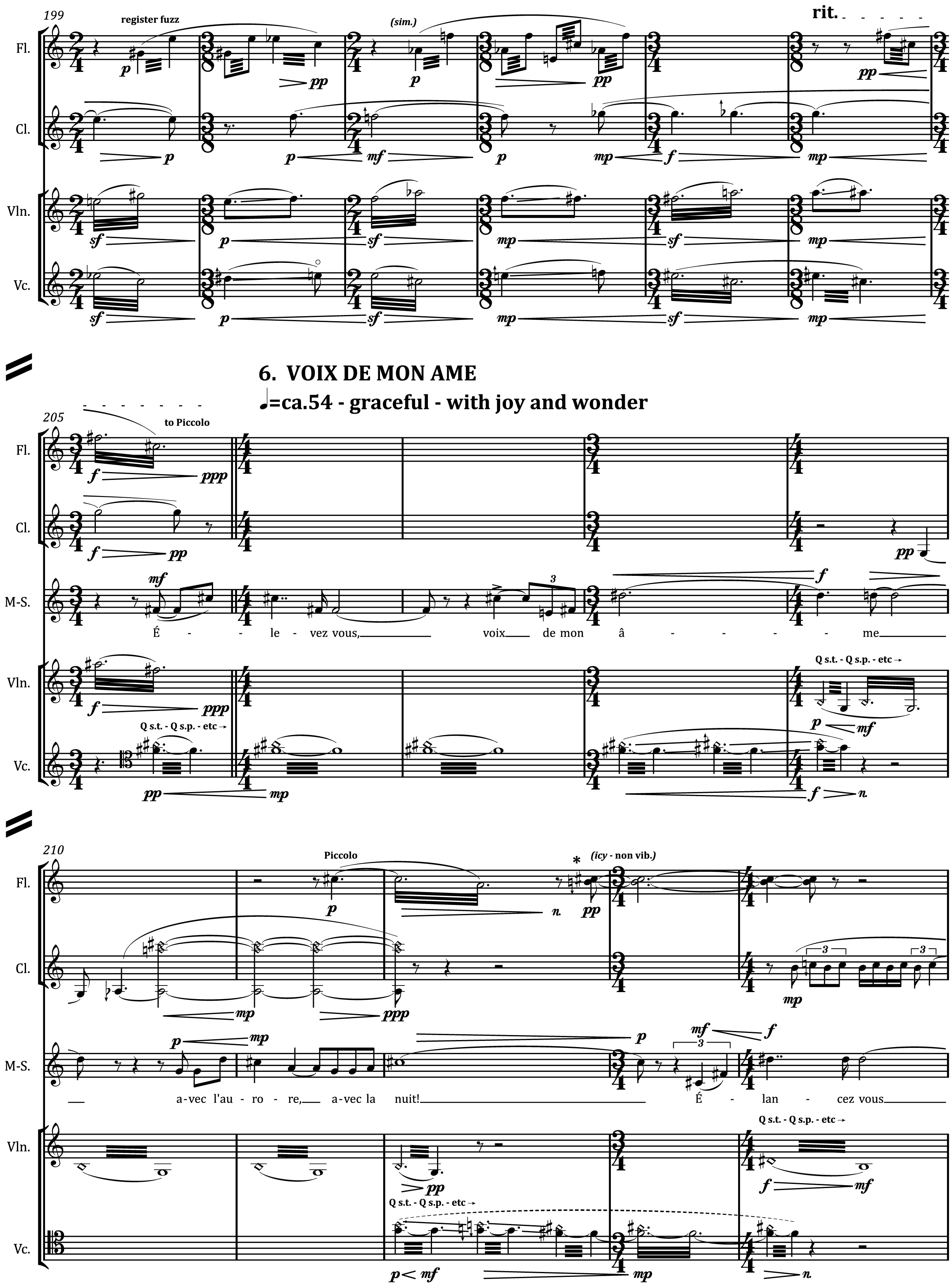
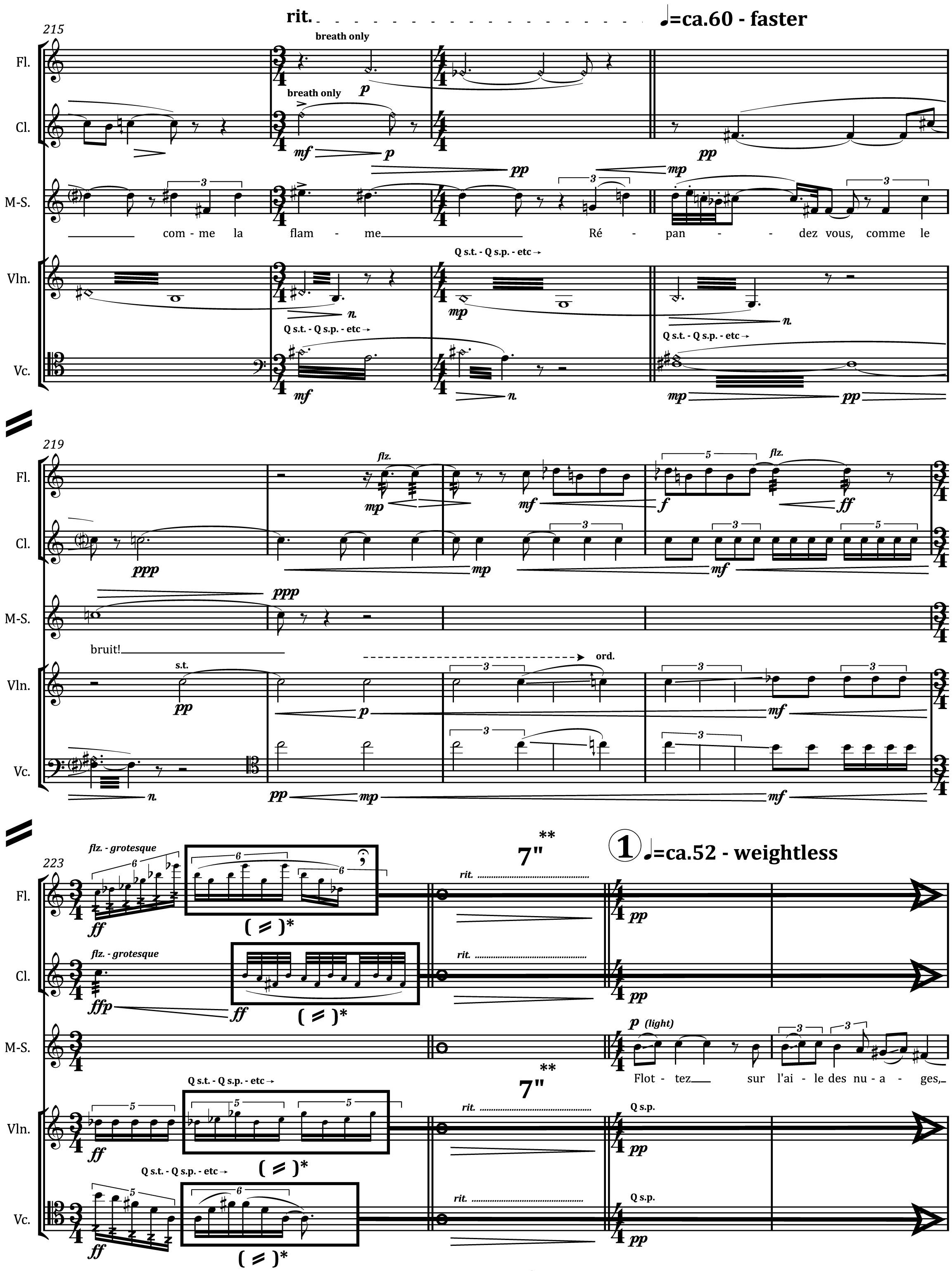
♩=ca.48 - with reverent awe


103
♩=ca.56 - more movement
Fl.
Cl.
M-S.
Vln.
Vc.
ord.
Bass Clarinet
moi qui tout à l'heure, in-cer - tain, a - - - - - - gi - té,
109
rit.
♩=ca.52 - slackening slightly
♩=ca.69 - agitated
sing & play
flz.
ord.
et sur les flots de dou-te à tout vent bal - lot - té Cher chais le bien, le vrai, dans les
sul I
mute off
ord.
Q s.p.
arco
116
molto rall.
♩=ca.56 - pained - a viscous texture
flz.
fltz.
(molto espress.)
rêves des sa - ges Et la paix dans des coeur re - ten - tis -
III
II


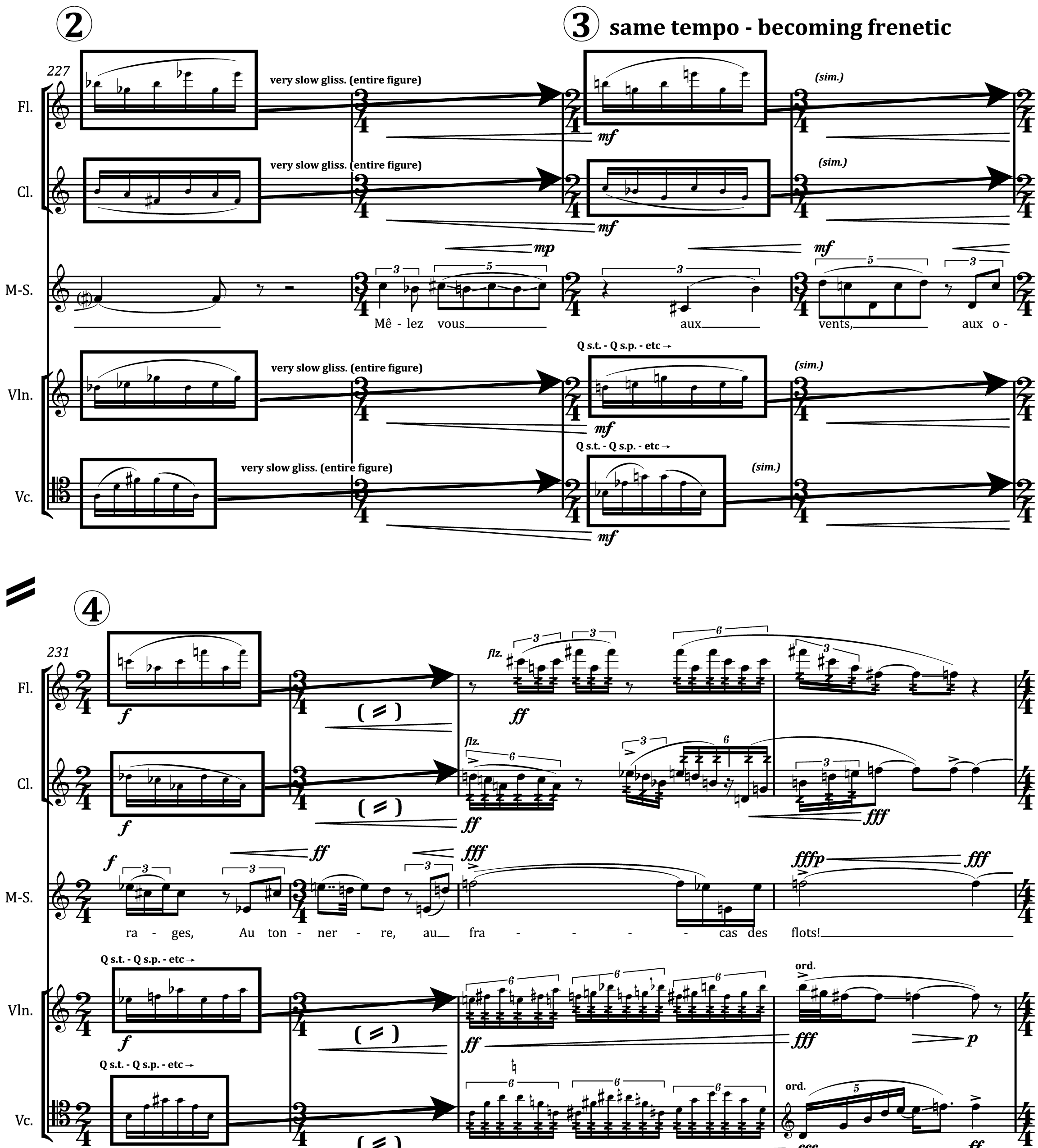
poco rit.
♩=ca.48 - slow
122
Fl.
Cl.
M-S.
Vln.
Vc.
to Flute
to B♭ Clarinet
Flute
non vib.
B♭ Clarinet
ord.
Q s.t.
s.t.
Q s.t. - Q s.p. - etc
sant d'or-a - - - - ges
A pe - i - ne sur mon
127
front quel-ques jours ont glis - - sé,
Q s.p. - Q s.t. - etc
sempre p

130
1
♩=ca.56 - slightly faster
Fl.
Cl.
M-S.
Vln.
Vc.
ppp (sempre)
pp (sempre)
mf
Il me semble qu'un si- ècle et qu'un monde ont
mp
repeat figure more frequently than before - non cresc.
repeat figure more frequently than before, moving fingers slightly sharp and flat each time - non cresc.
135
2
♩=ca.48 - slower - bubbling
pp
mp
mf
n.
f
pas - sé, Et que sé - pa-ré d'eux par un a - bîme im - men - se,
repeat figure ever more frequently - poco cresc..
repeat figure ever more frequently, more out-of-tune each time - poco cresc.
3
7"
141
hold as long as possible, or until cue 1
1
♩=ca.48 - icy & static
mf
n.
p
pp (freely)
sé-pa-ré d'eux par un a - bî - me im -
molto rit. - dim.
molto rit. - dim., still out-of-tune
ord.
non vib.
ppp


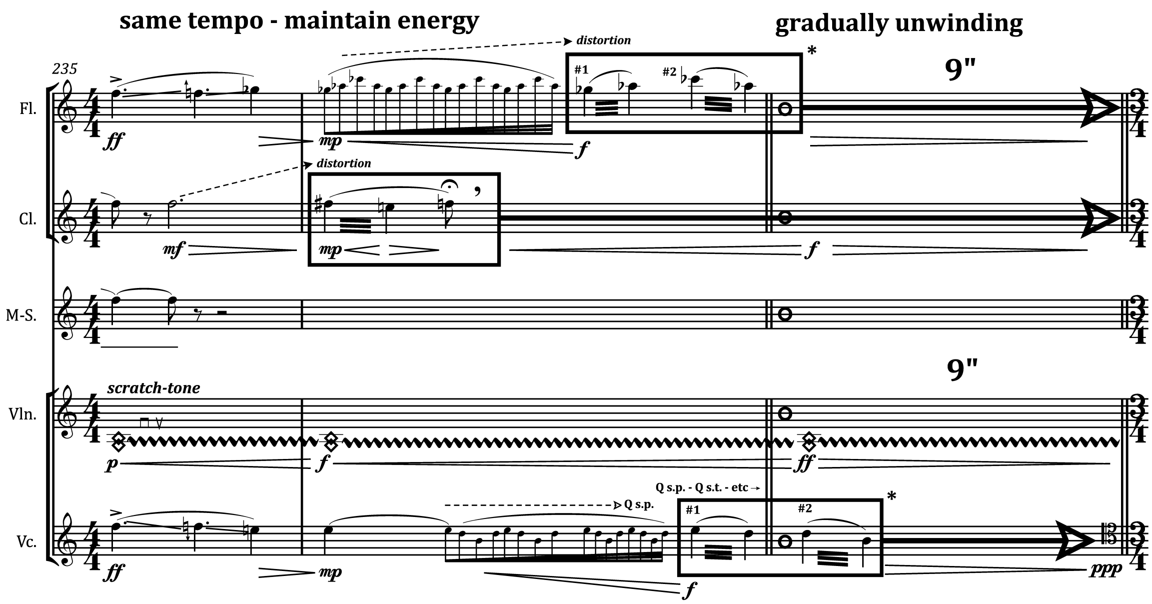
145
Cl.
breath only
n.
mp
n.
M-S.
pp
p
mp
men - se
Un nou - vel homme en moi re - naît et re - com -
Vln.
s.p.
n.
Vc.
s.p.
n.
5. INTERLUDE
♩=ca.63 - doleful
149
Fl.
breath only
sf
n.
(suh suh suh suh suh)
ord.
pp
mf
Cl.
rapide possible
p
ff
pp
mf
M-S.
mf
ff
men - - - - - - - ce.
Vln.
ord.
p
f
rapide possible
Q s.p.
fff
pp
mf
Vc.
ord.
p
f
rapide possible
Q s.p.
fff
pp
mf
153
rit.
♩=ca.63
rit.
♩=ca.56
Fl.
p
ppp
pp
f
p
ppp
Cl.
p
ppp
pp
f
p
ppp
Vln.
pizz.
p
ppp
pp
f
p
pp
mp
Vc.
p
ppp
pp
f
p
ppp
pp


158
Fl.
Vln.
Vc.
L.H. pizz.
pizz.
pizz trem.
164
♩=ca.63 - faster, but still melancholy
arco
169
same tempo, but more dynamic
Cl.
play
sing
breath only
slightly out-of-tune
ord.
sul I - 4th part.
double w/voice - (nasal errr)
(errr)
173
non vib.
sul II - 3rd part.
Q s.p.
out-of-tune
double w/voice - (nasal aaa) *
sul I - 4th part.
(aaa)
* Like "a" in apple


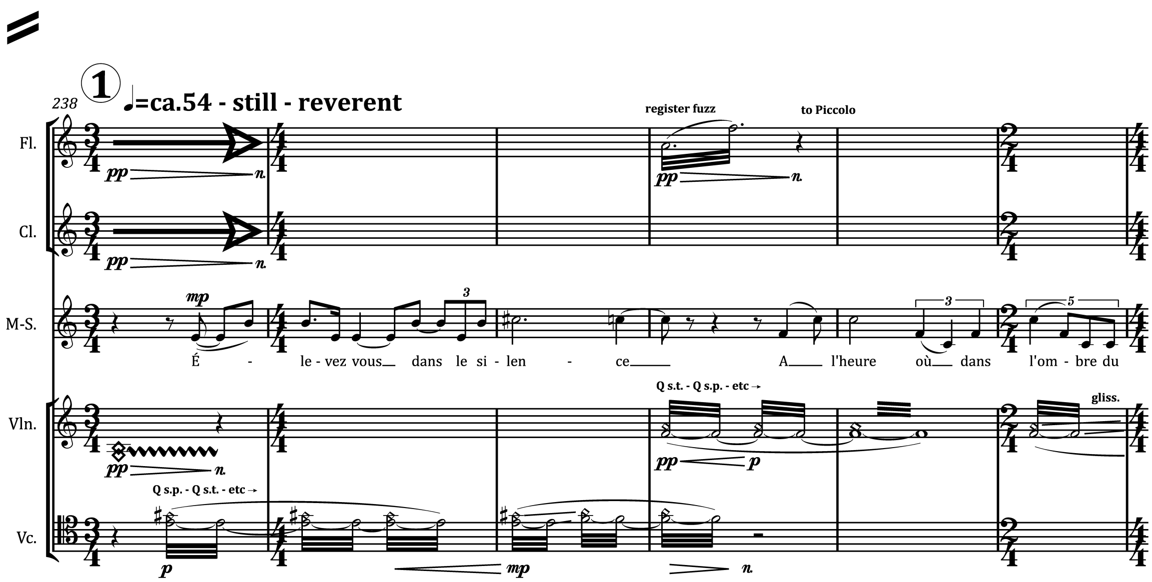
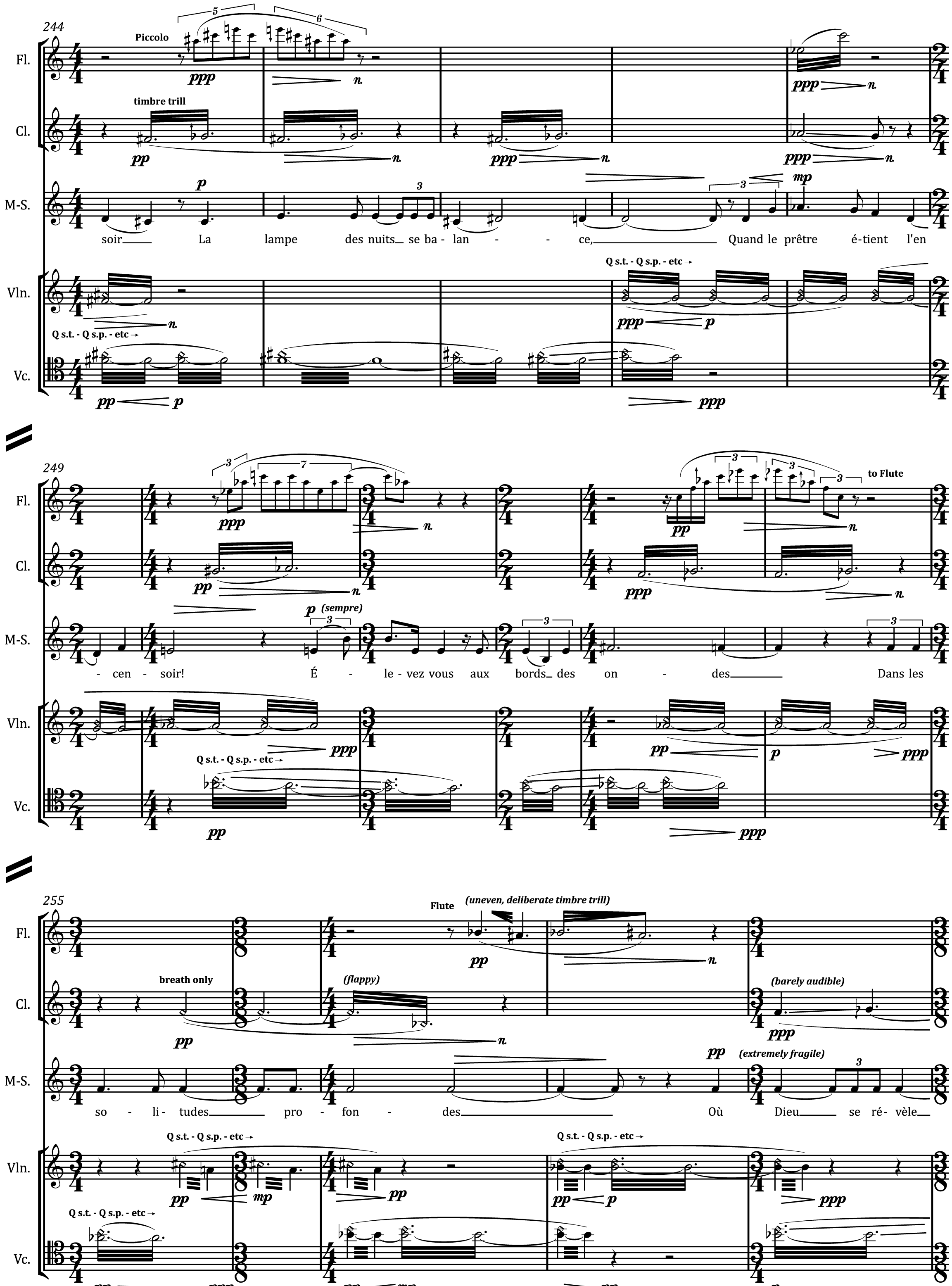
=ca.69 - faster - always becoming more aggressive
177
Fl.
Cl.
Vln.
Vc.
percussive whisper
sheh shay
sheh shay sheh
shay
Sheh shay
breath only
ord.
double w/voice (nasal err to aaa)
(as before)
(errr aaa)
(sim)
accel.
181
shh!
shh
=ca.60 - winding tighter and tighter
accel.
=ca.72
184
quasi gliss.
very constant, slow gliss.
(nasal)
M-S.
errr
shh
very constant, slow gliss.

188
♩=ca.66
to Picc.
Piccolo
(possible)
(sh)wah
whah
whah
ooo
Q s.p.
ord.
sul II
191
♩=ca.72 - moving forward
to flute
Flute
dark tone
bright
(airy - non vib.)
(sim.)
ahh
ooo
ah
s.t.
double with voice
195
rit.
♩=ca.63 - blossoming
oh
eee - yoh - eee - yoh - eee
mmm
Fl.
Cl.
M-S.
Vln.
Vc.

* Finger low C#, lift thumb

* While playing figure, randomly insert tremolo (*flz.* for flute & clar.). The order of pitches and the duration of the figure may be chosen randomly. Extraneous noises, such as register fuzz or bow hiss, are desirable. These figures should also be played slightly out-of-tune.

** Over the course of seven seconds, gradually morph texture into a soft cloud of sound. Individual repeated figures should slow and become gradually less aggressive (violin may begin slurring). A general diminuendo of the ensemble to *pp* should result.


2
3 same tempo - becoming frenetic
227
Fl.
Cl.
M-S.
Vln.
Vc.
very slow gliss. (entire figure)
(sim.)
mf
mp
Mê - lez vous aux vents, aux o -
Q s.t. - Q s.p. - etc
4
231
flz.
ord.
f
ff
fff
fffp
p
ra - ges, Au ton - ner - re, au fra - - - - - cas des flots!



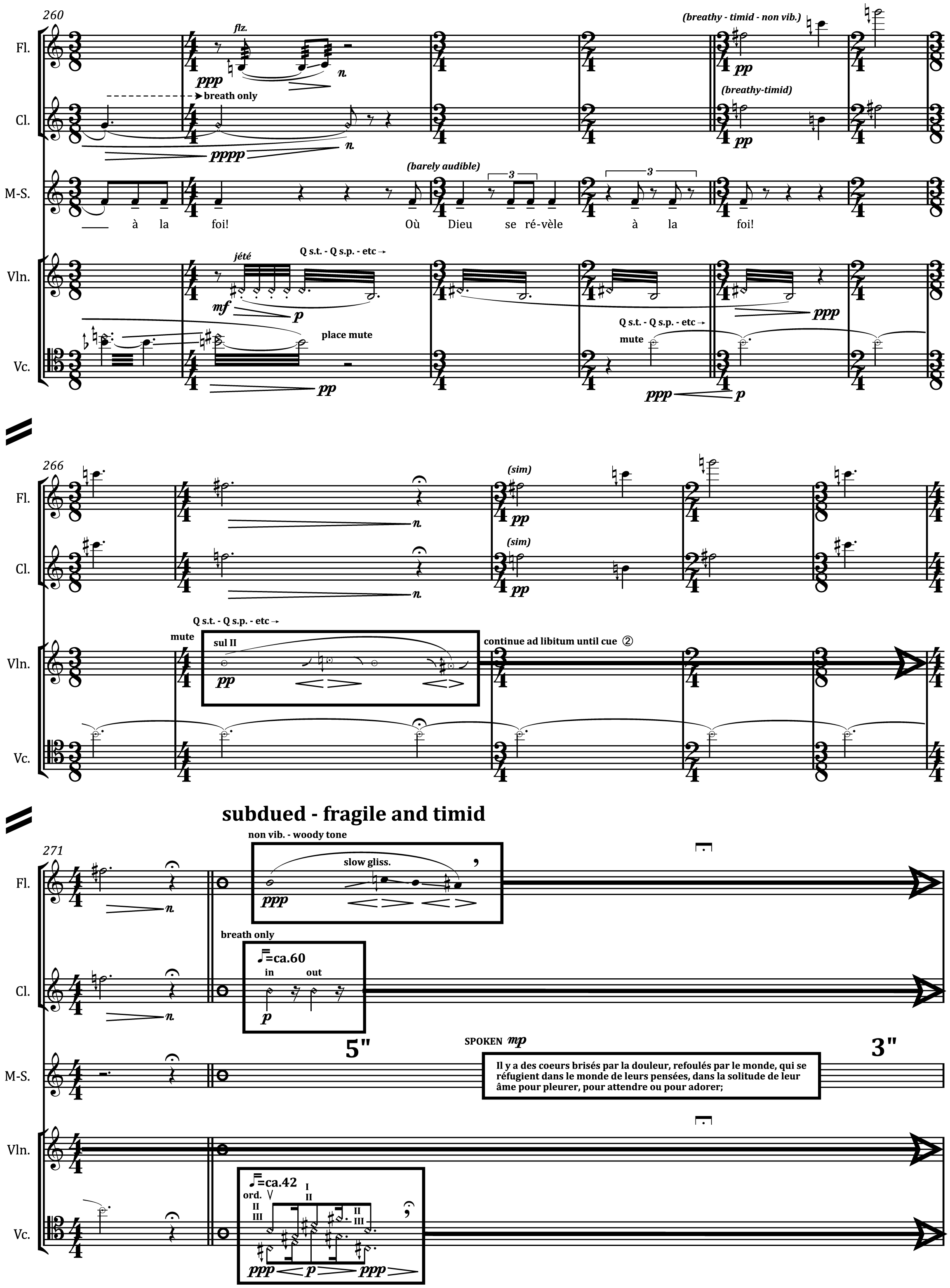
* Alternate frequently between numbers 1 & 2, while constantly moving in and out of tune (cello, flat - flute, sharp).

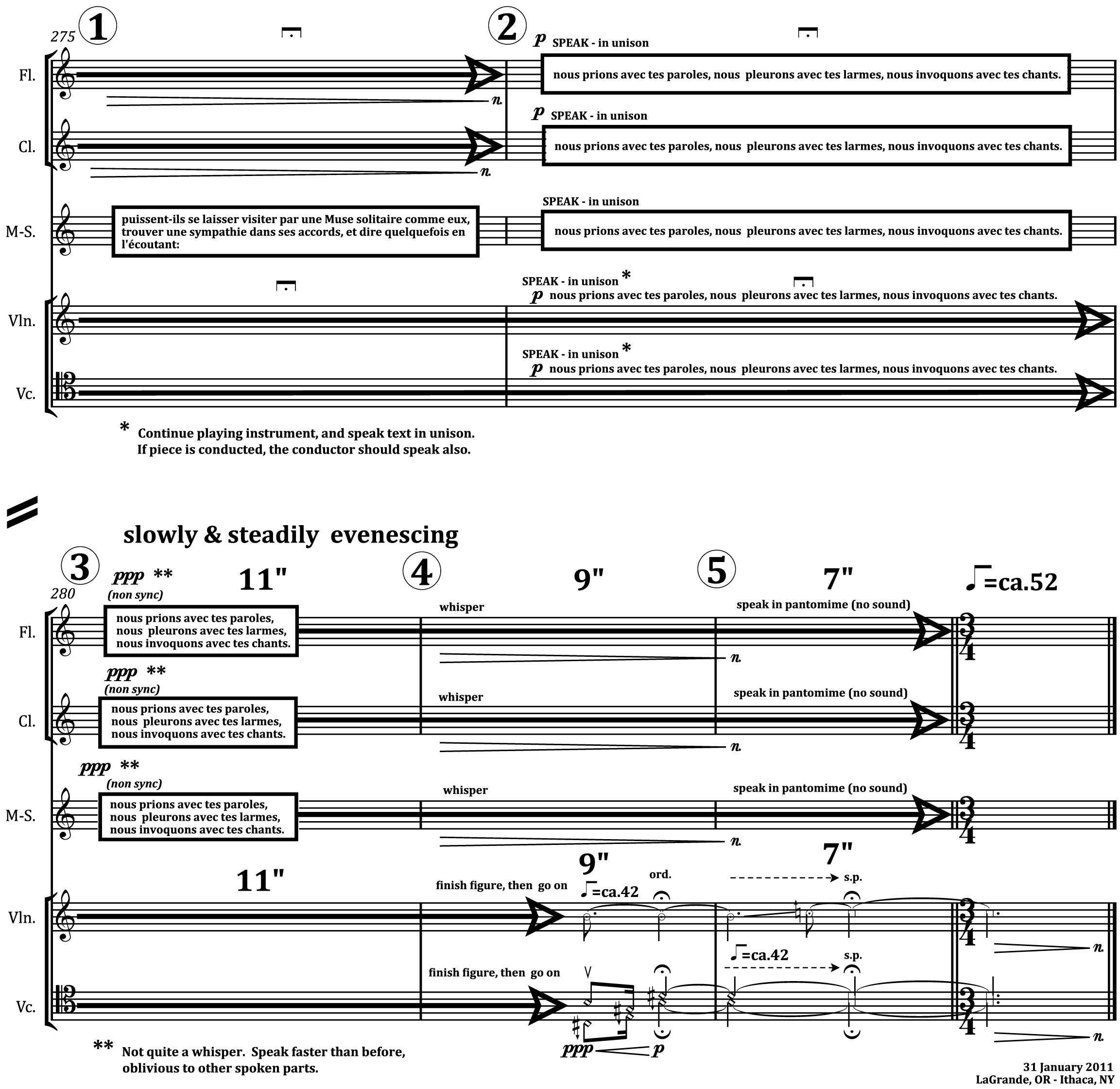



244
Piccolo
timbre trill
soir La lampe des nuits se ba - lan - - ce, Quand le prêtre é-tient l'en
Q s.t. - Q s.p. - etc →
249
to Flute
- cen - soir! É - le-vez vous aux bords des on - des Dans les
(sempre)
255
Flute
(uneven, deliberate timbre trill)
breath only
(flappy)
(barely audible)
(extremely fragile)
so - li-tudes pro - fon - des Où Dieu se ré-vèle

7. EPILOGUE

♩=ca.42 - serene





31 January 2011
LaGrande, OR - Ithaca, NY

THE LONE AND LEVEL SANDS

Jesse Jones
(2010)

Written for the Cornell Festival Chamber Orchestra

THE LONE AND LEVEL SANDS

Jesse Jones

INSTRUMENTATION

Flute

Oboe

B-flat Clarinet

Bassoon

Horn

C Trumpet

Trombone

Percussion

Piano

2 Violins

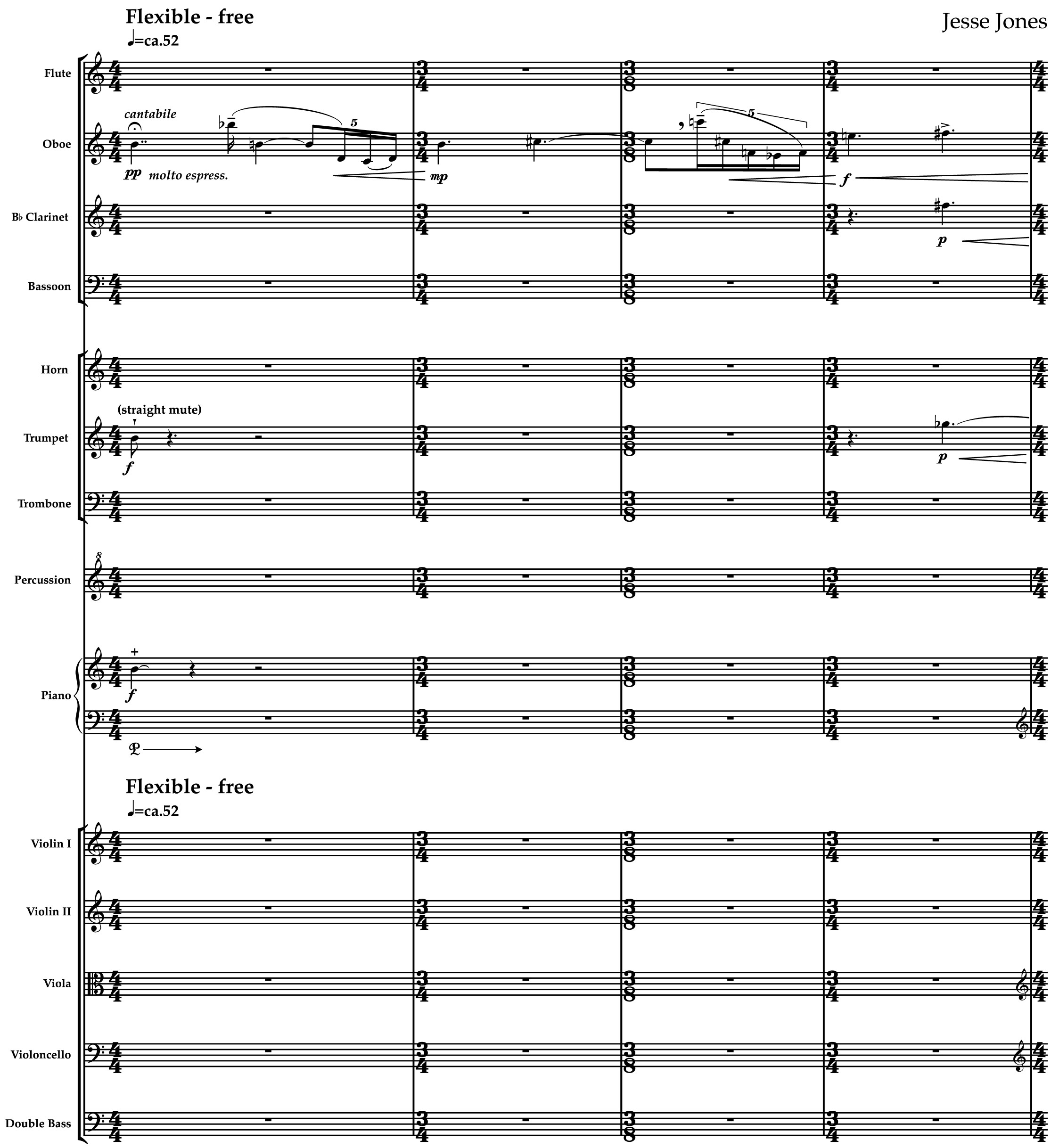
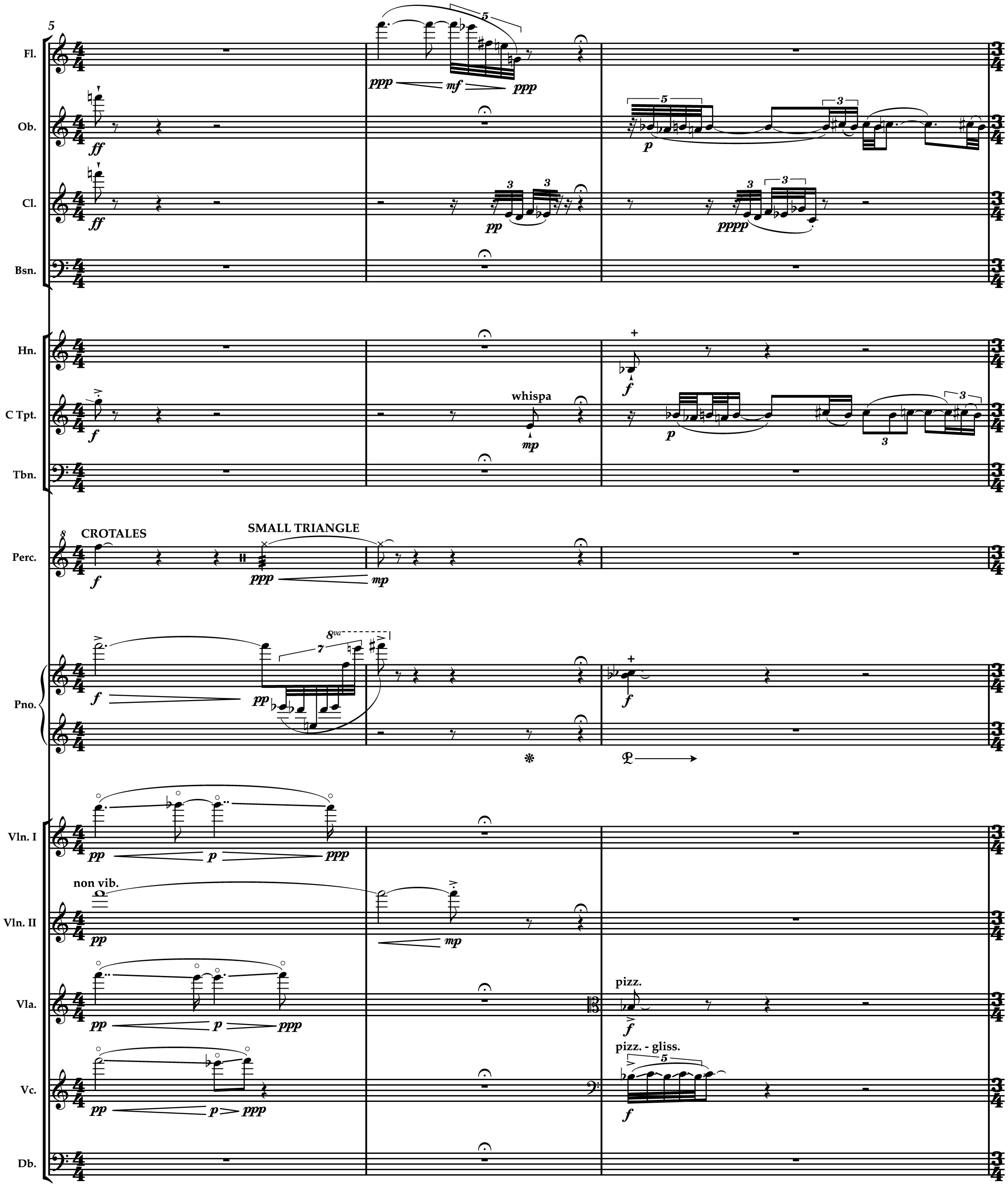
Viola

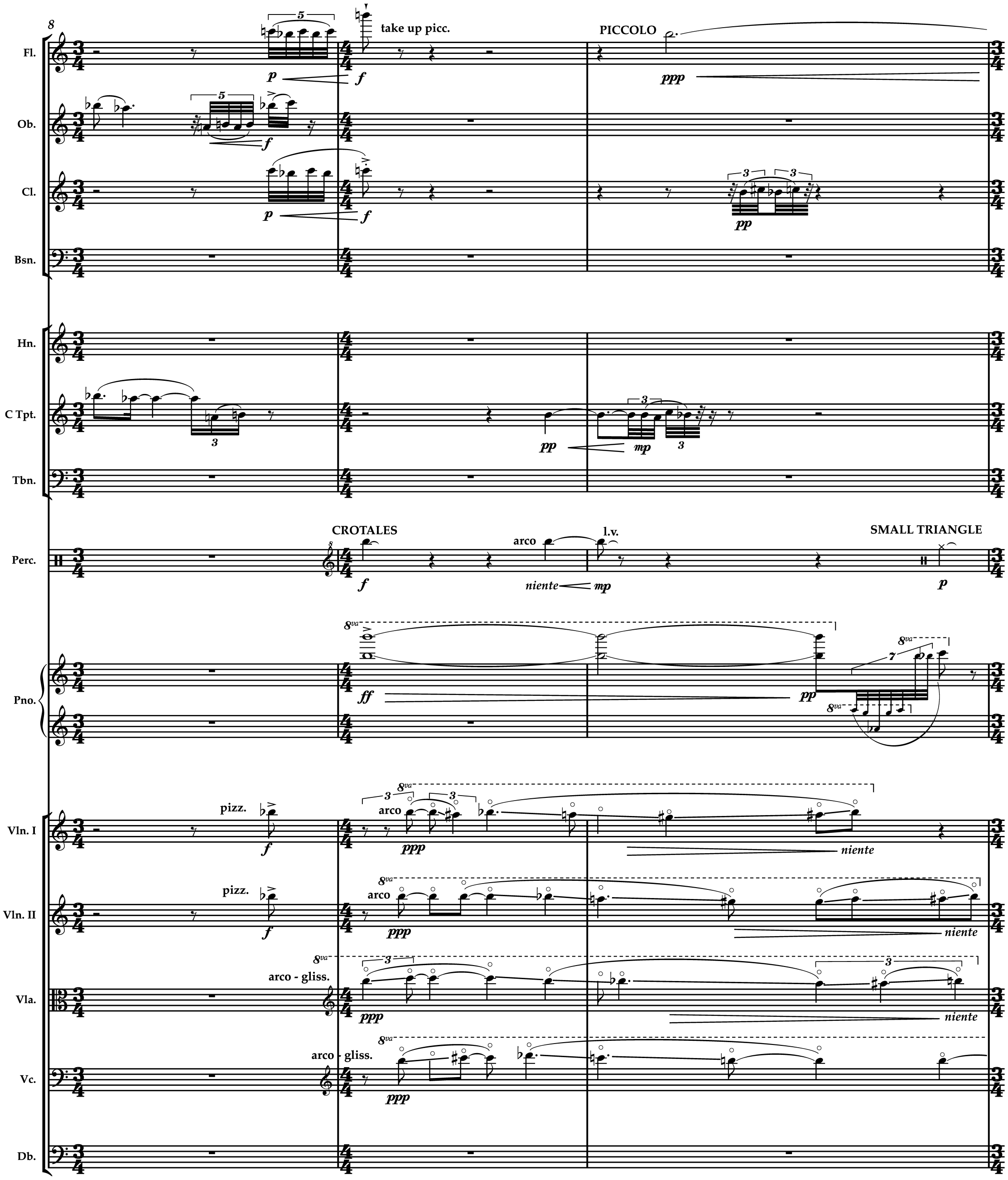
Violoncello

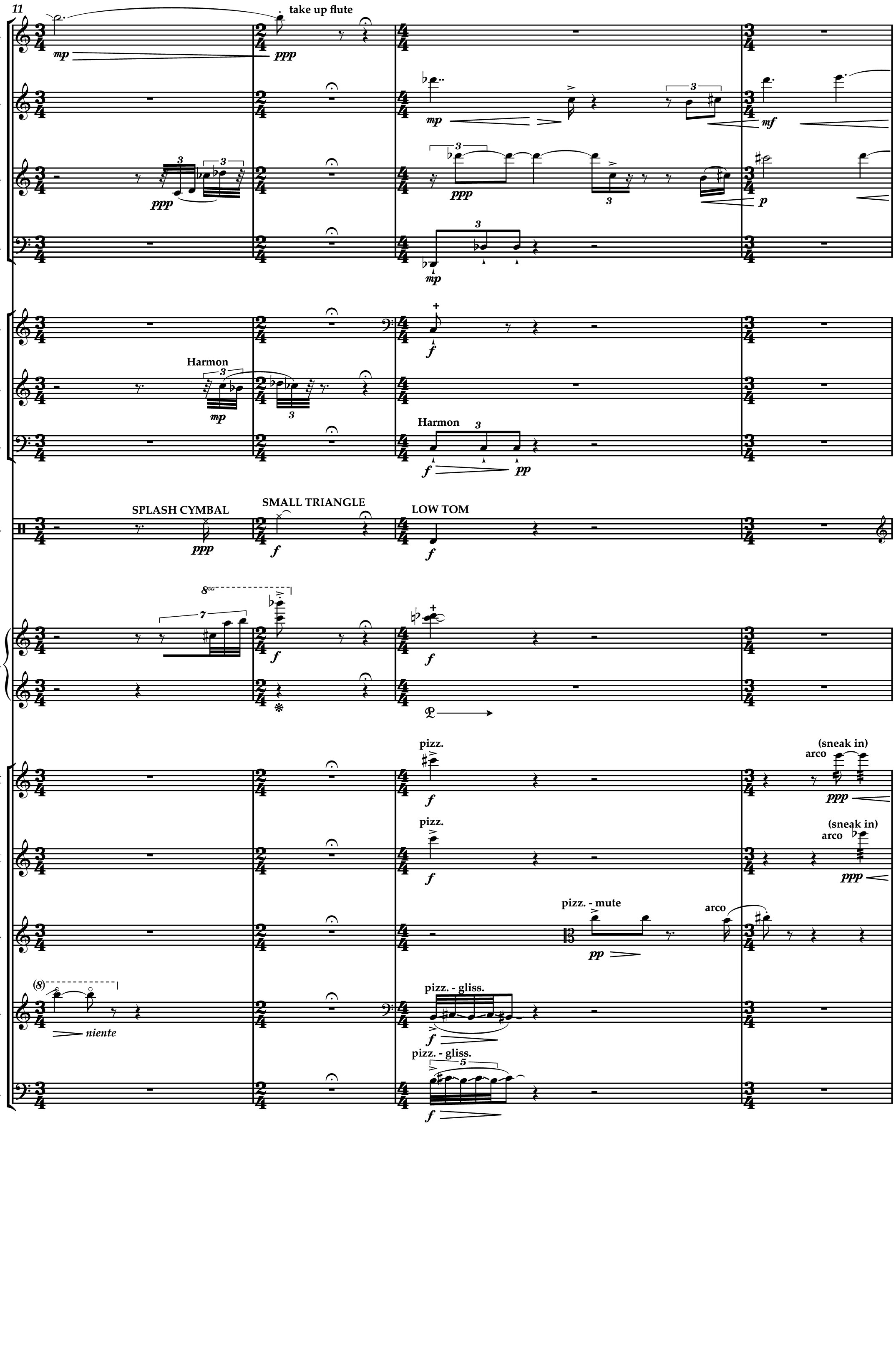
Contrabass

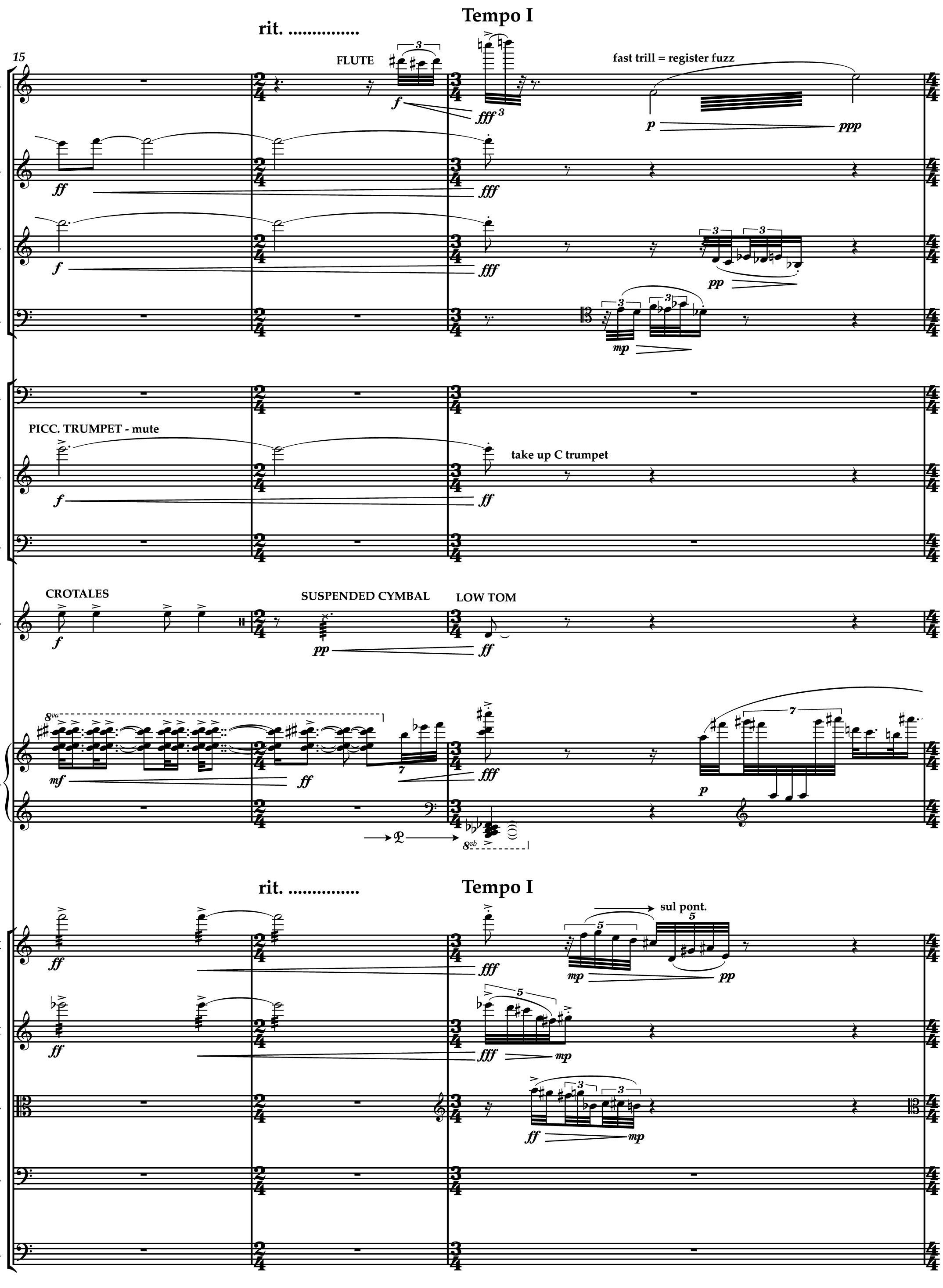
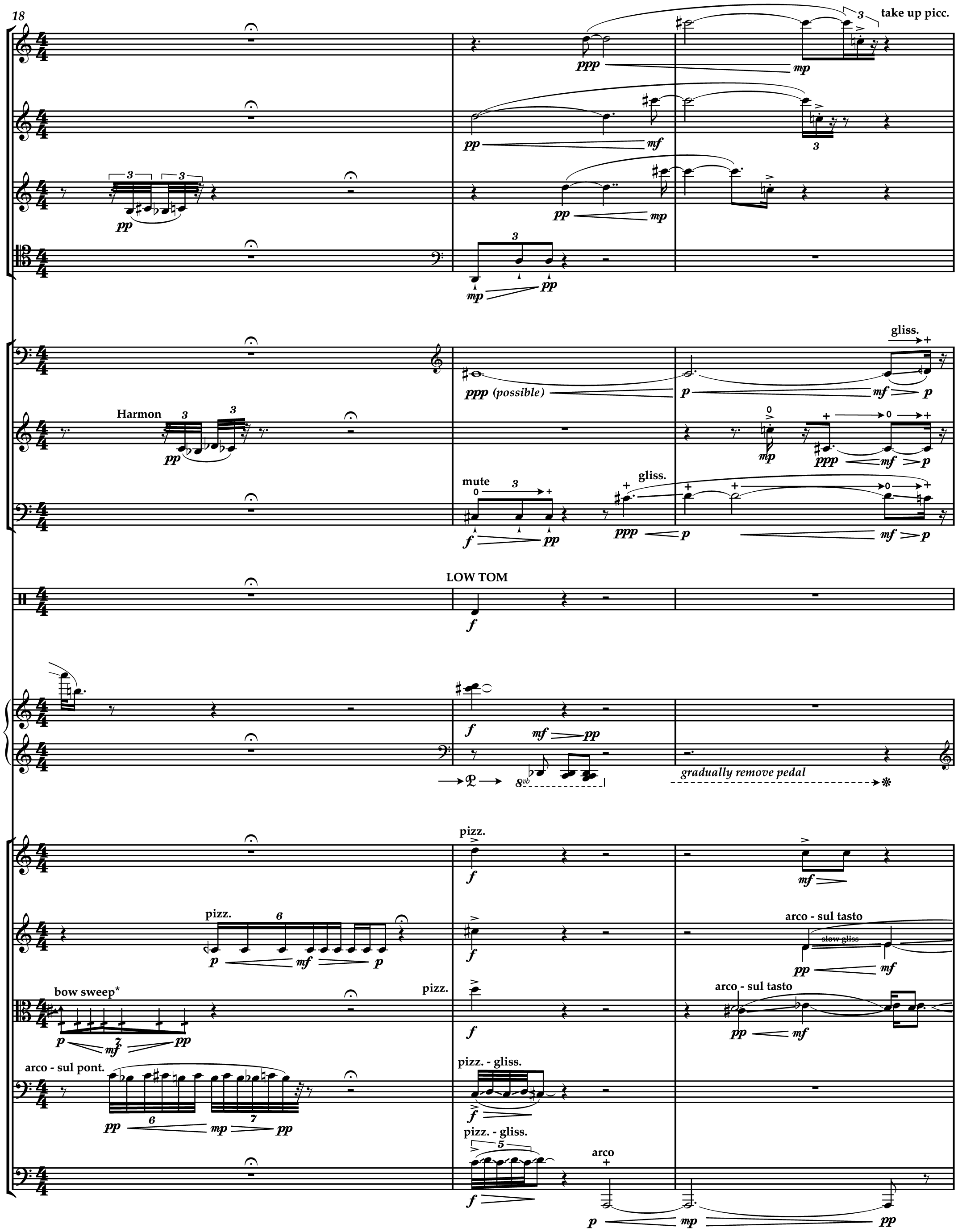
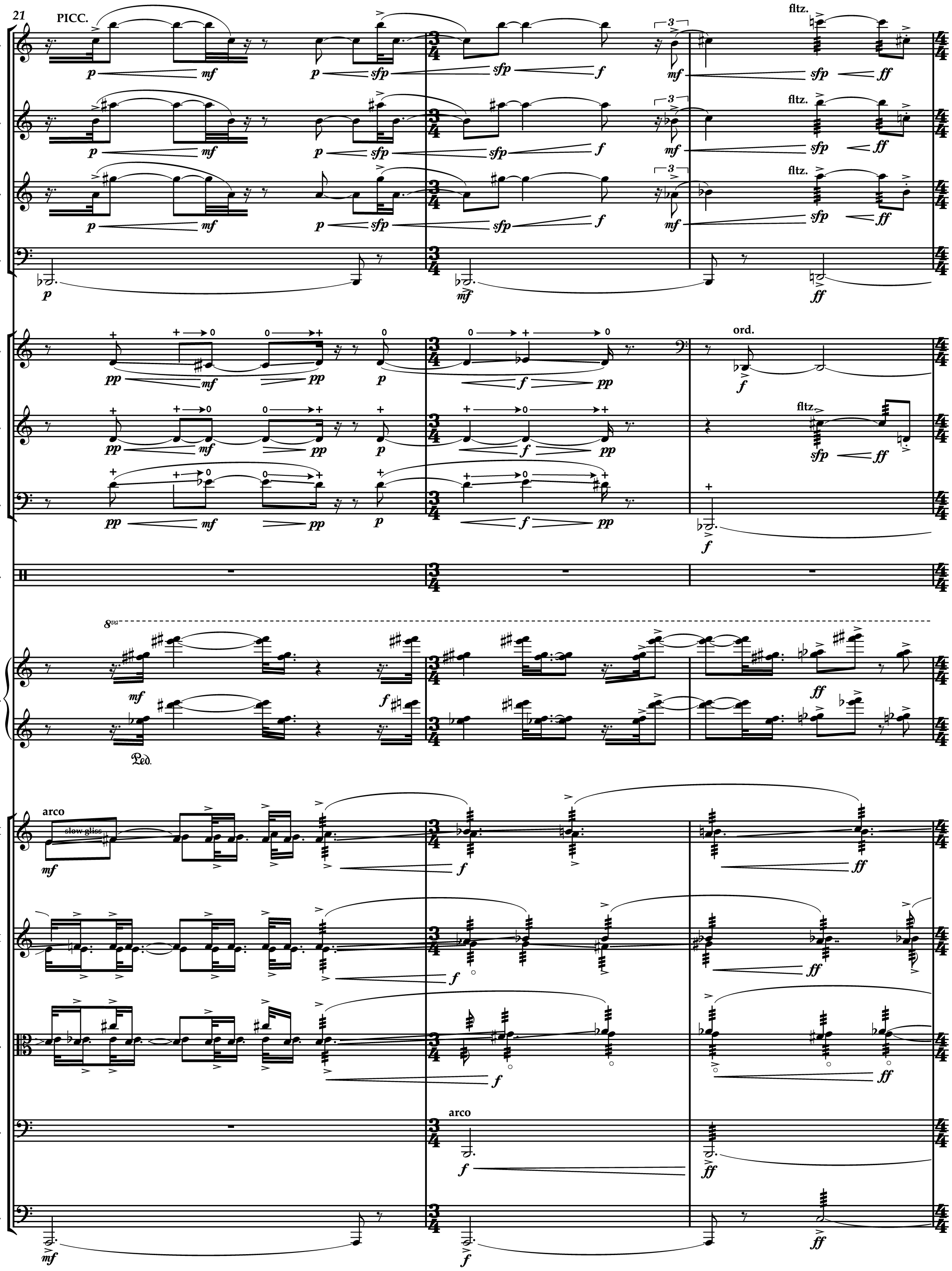
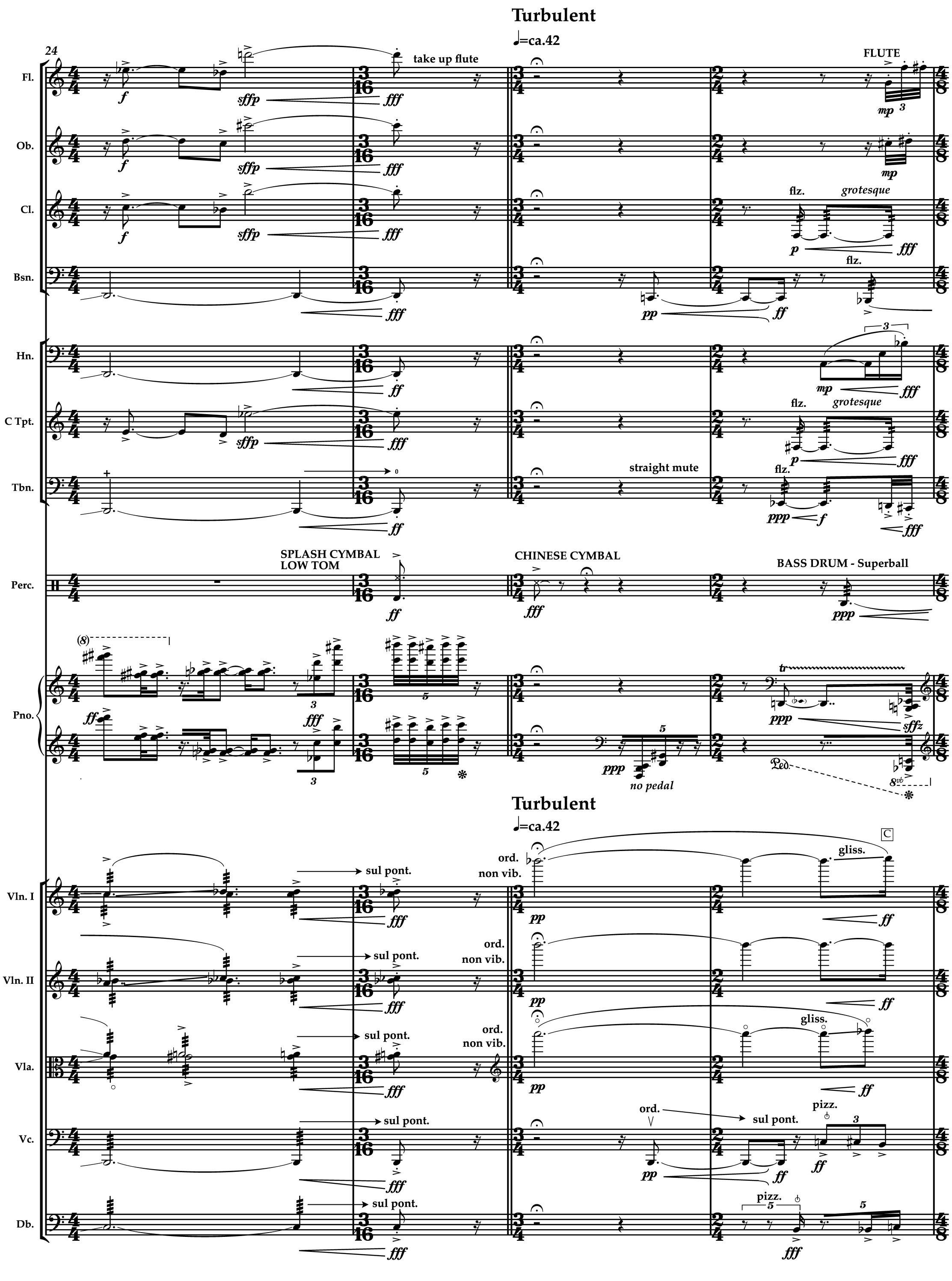
Duration: ca. 5 minutes

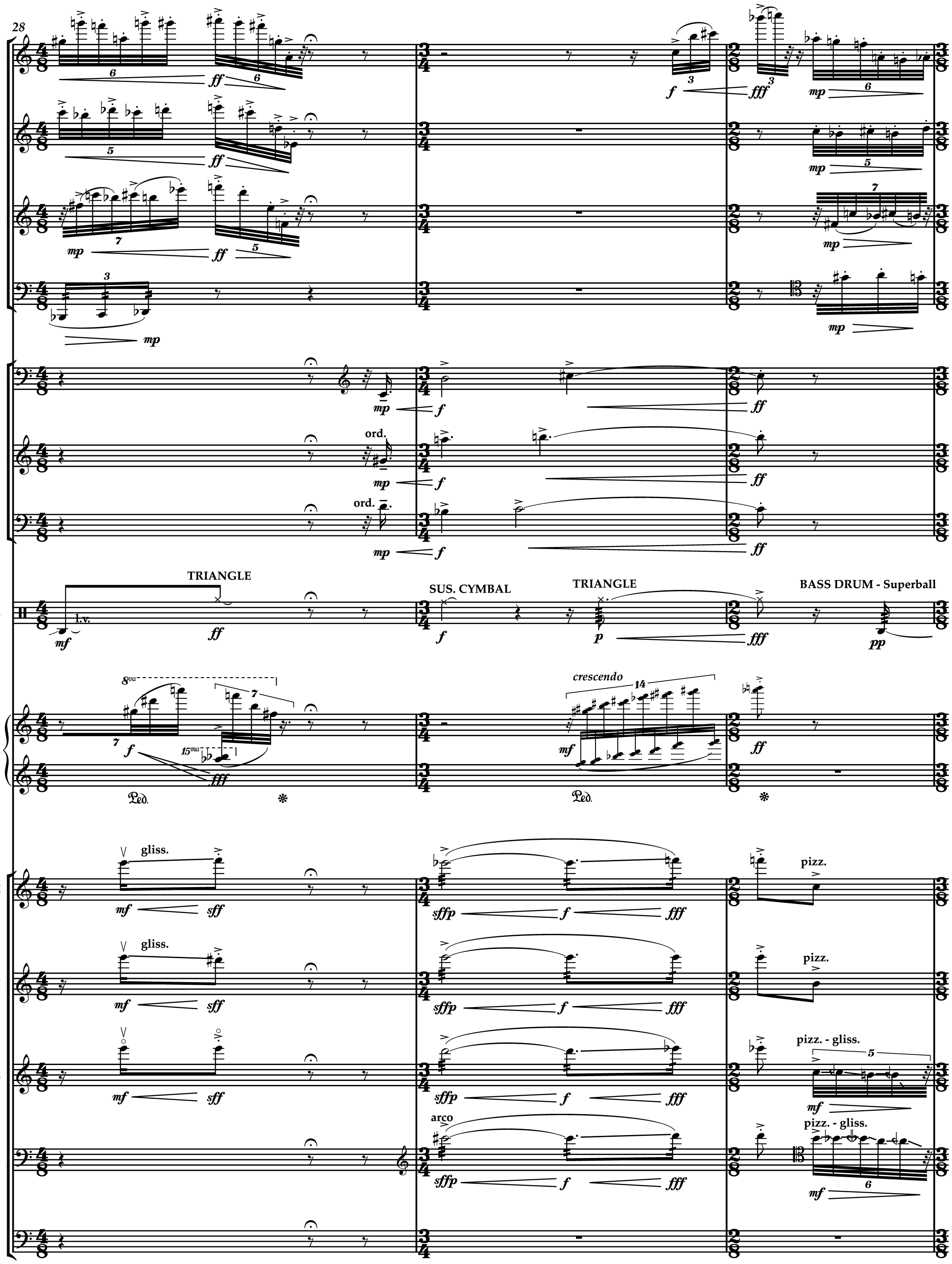
THE LONE AND LEVEL SANDS

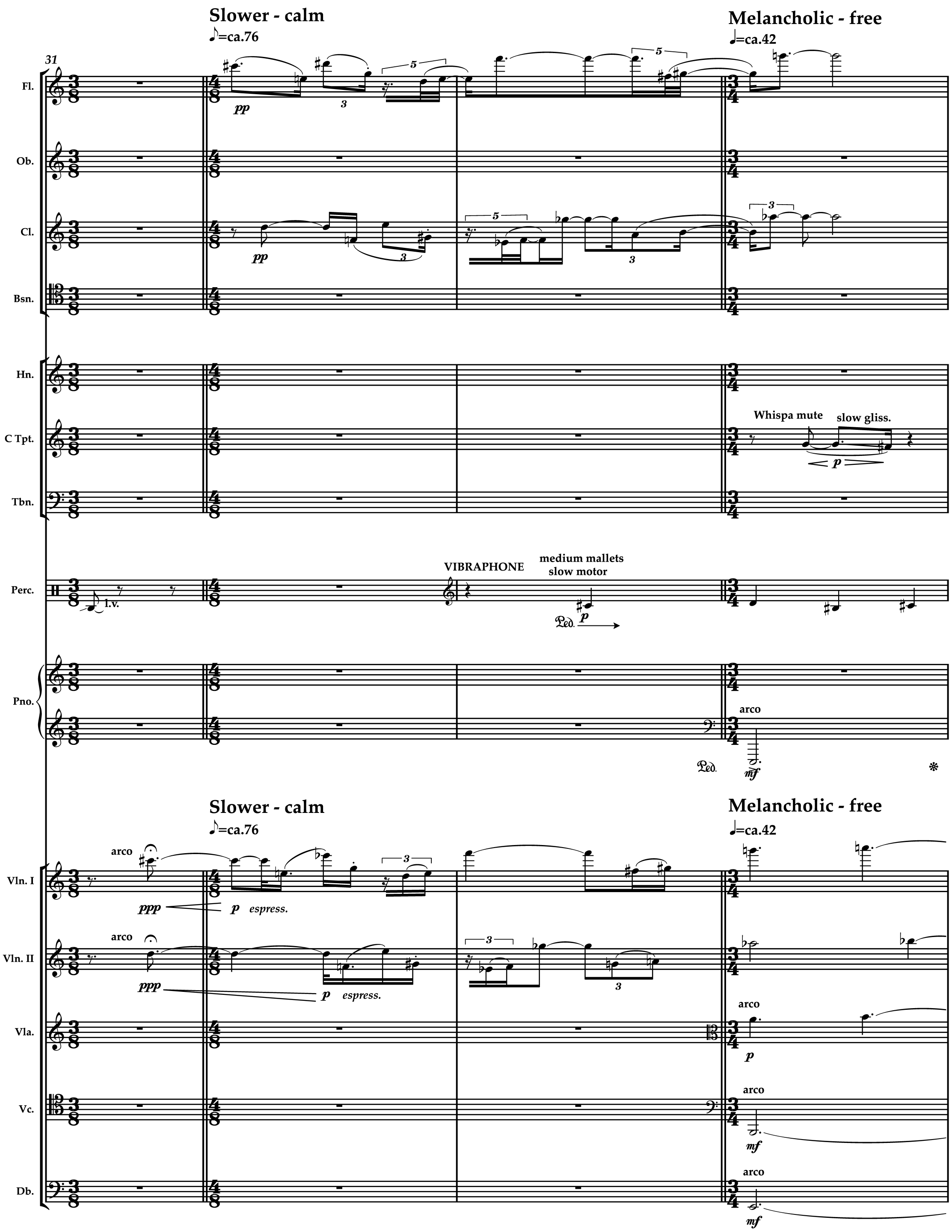
Jesse Jones


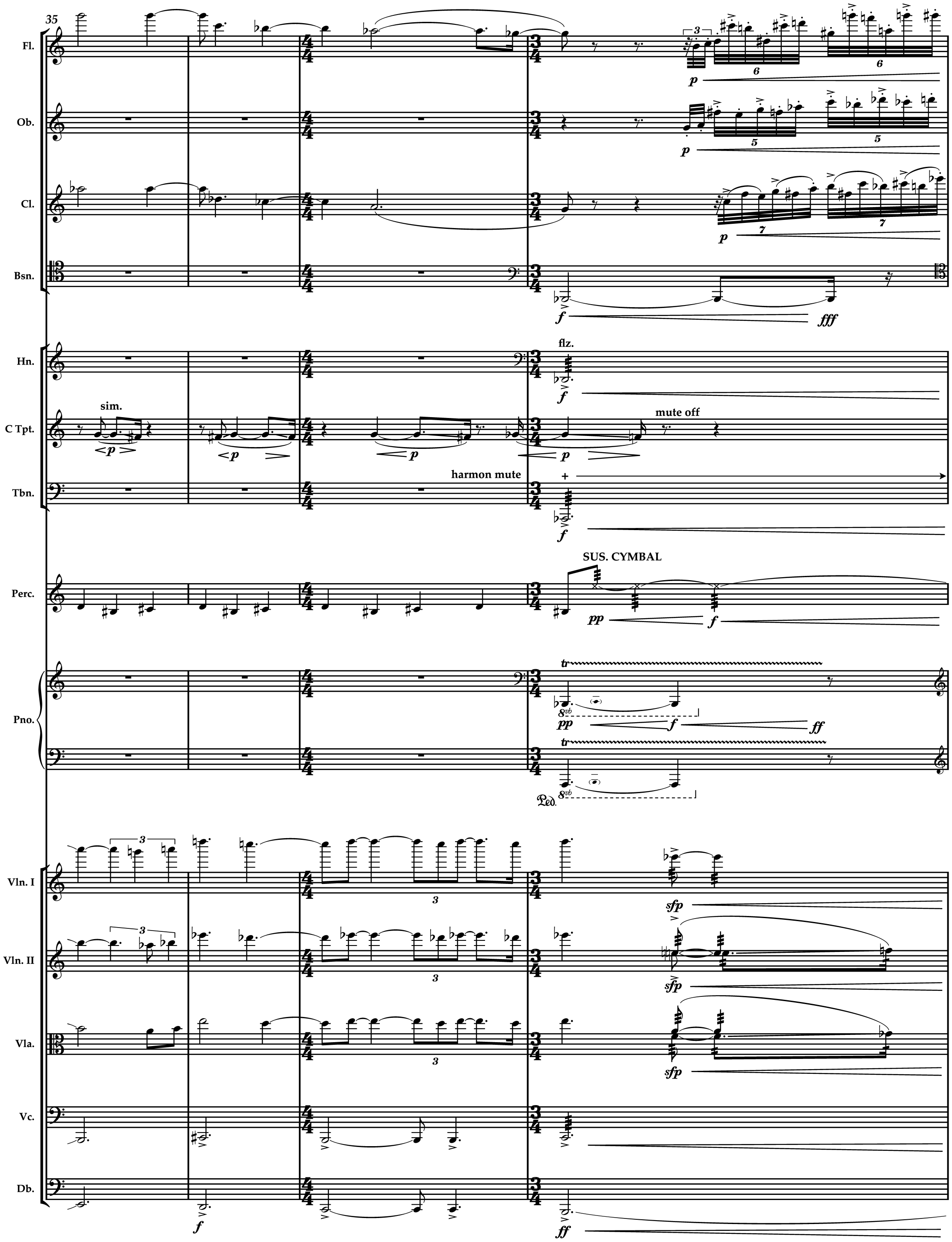
5
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
whispa
Tbn.
Perc.
CROTALES
SMALL TRIANGLE
Pno.
Vln. I
Vln. II
non vib.
Vla.
pizz.
Vc.
pizz. - gliss.
Db.


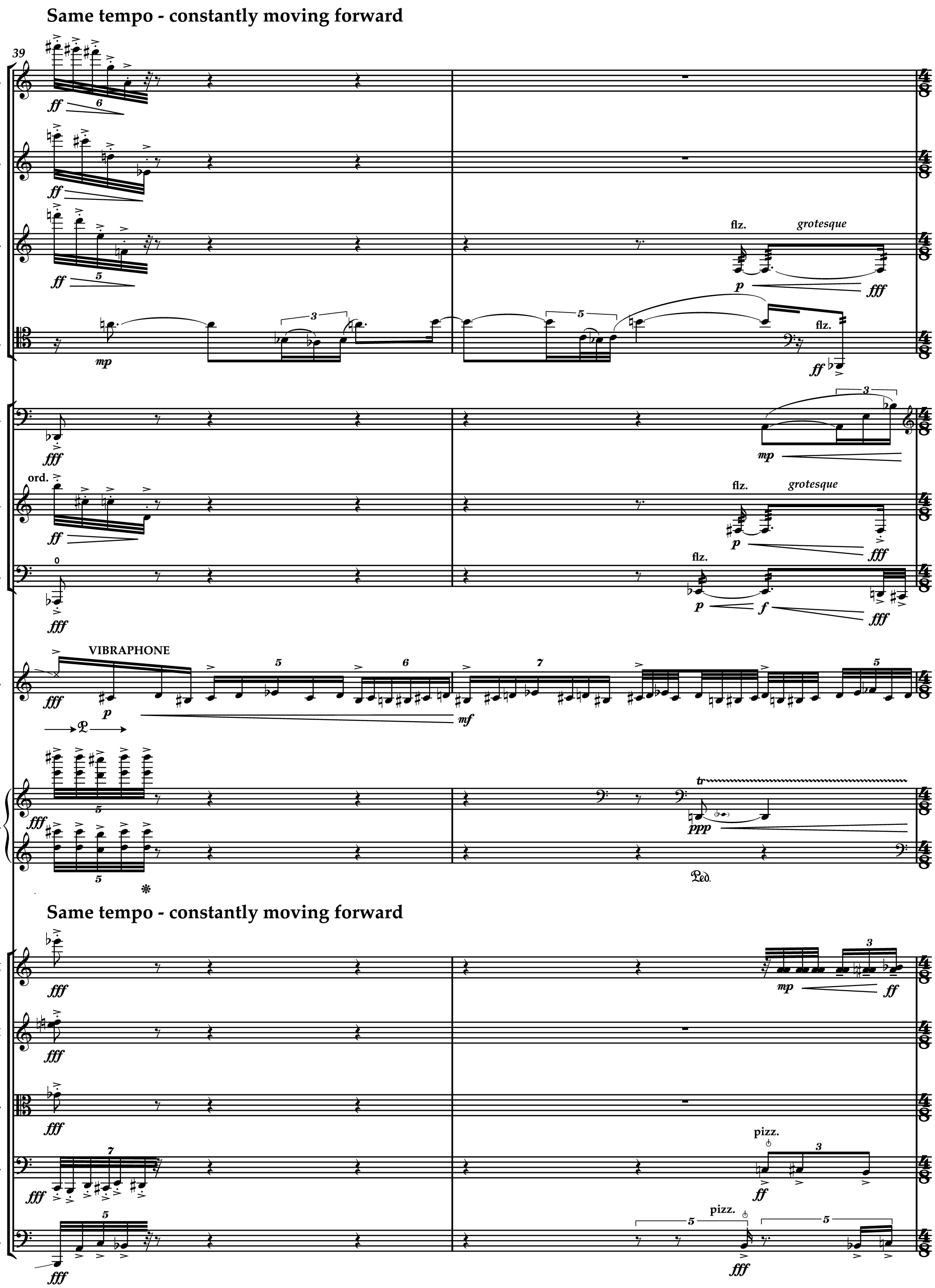
8
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
take up picc.
PICCOLO
CROTALES
arco
l.v.
SMALL TRIANGLE
niente
pizz.
arco
arco - gliss.


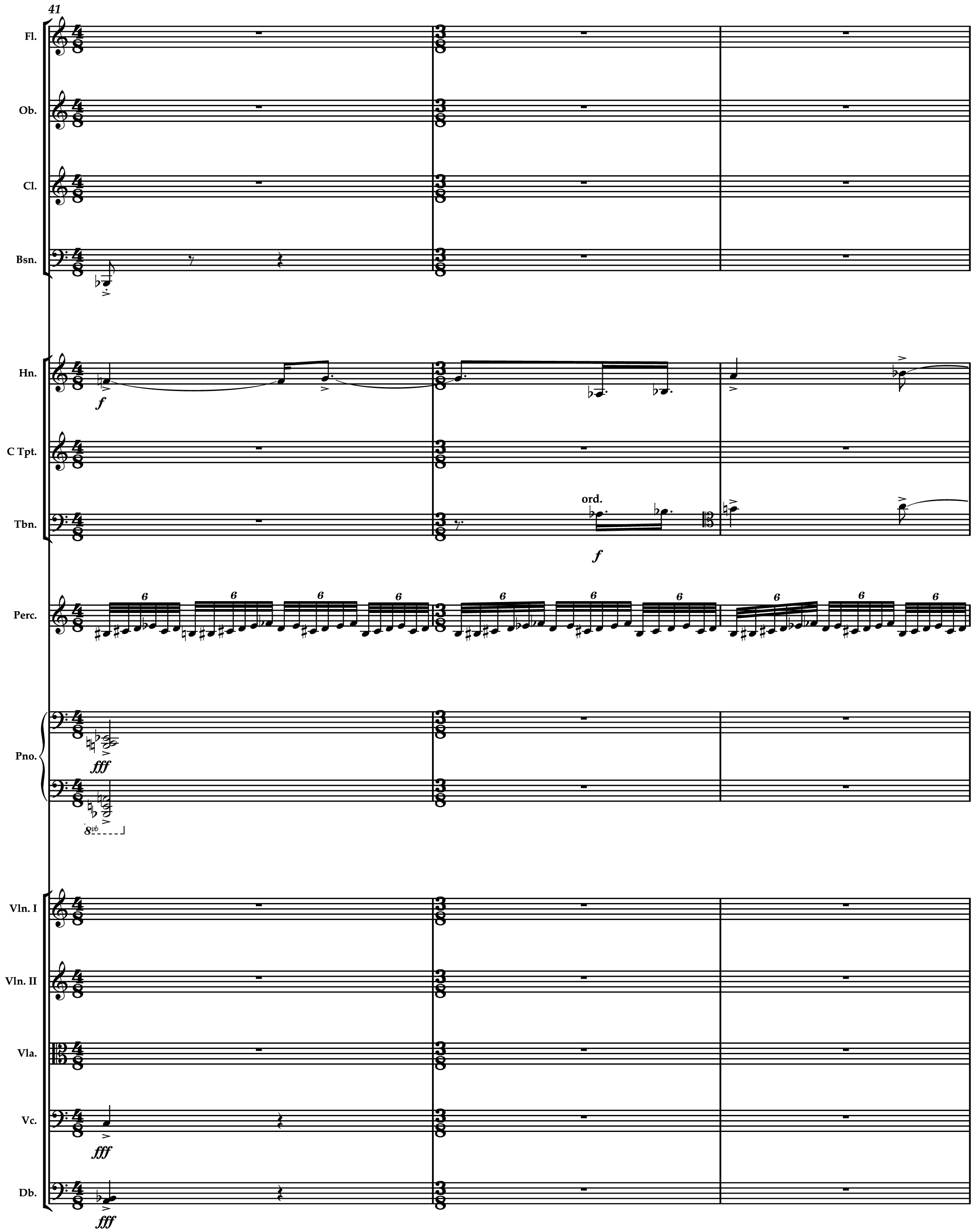
11
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
take up flute
Harmon
Harmon
SPLASH CYMBAL
SMALL TRIANGLE
LOW TOM
pizz.
pizz.
pizz. - mute
arco
pizz. - gliss.
pizz. - gliss.
(sneak in)
arco
(sneak in)
arco
niente

rit. ....
Tempo I
15
Fl.
FLUTE
fast trill = register fuzz
Ob.
Cl.
Bsn.
Hn.
PICC. TRUMPET - mute
C Tpt.
take up C trumpet
Tbn.
CROTALES
SUSPENDED CYMBAL
LOW TOM
Perc.
Pno.
rit. ....
Tempo I
sul pont.
Vln. I
Vln. II
Vla.
Vc.
Db.

* Holding the bow tightly in the fist, move the bow up and down the string (from sul tasto to sul pont.) in a steady sweeping motion.

21
PICC.
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
fltz.
ord.
arco
slow gliss.


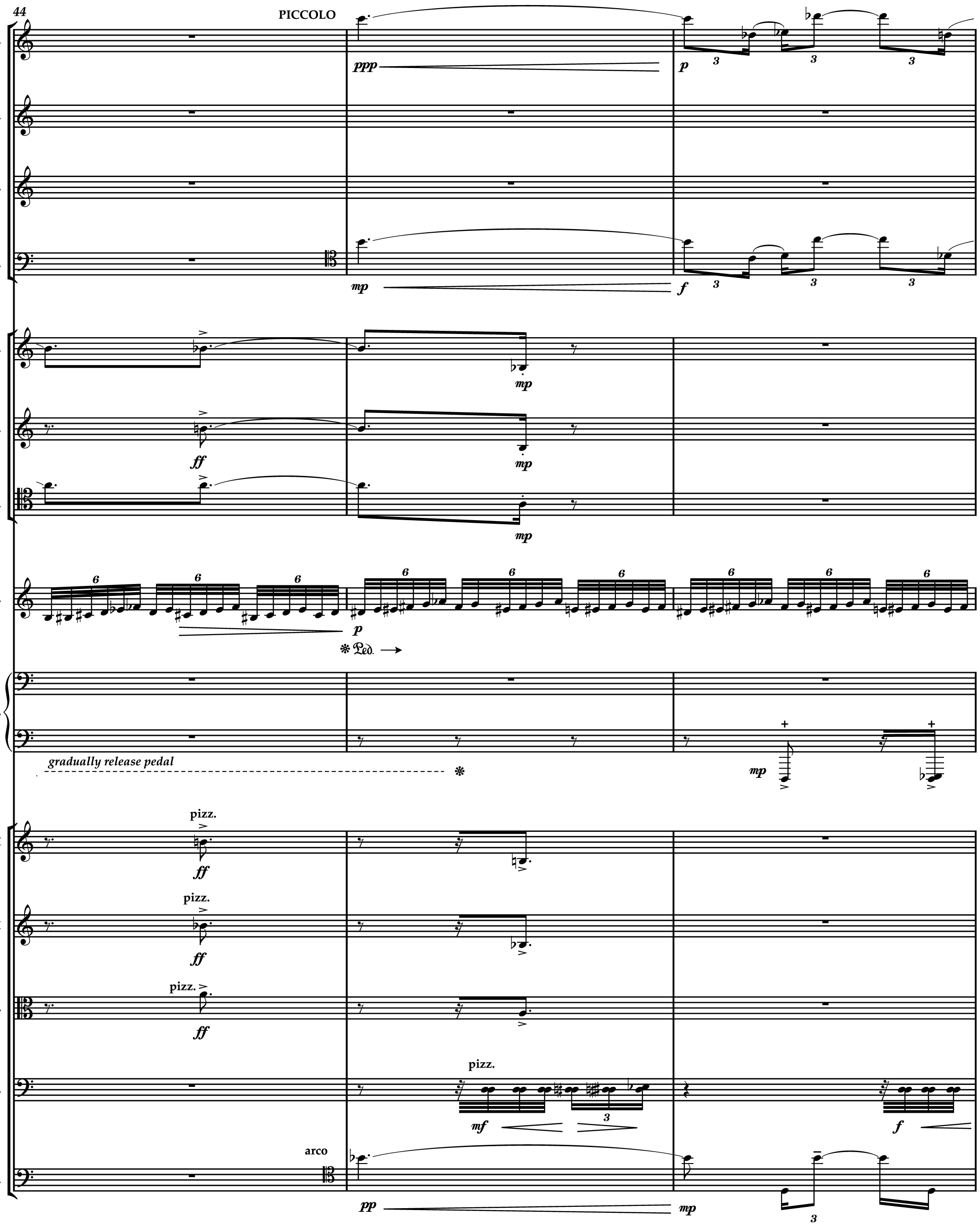
Turbulent
♩=ca.42
24
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
take up flute
FLUTE
flz.
grotesque
straight mute
SPLASH CYMBAL
LOW TOM
CHINESE CYMBAL
BASS DRUM - Superball
no pedal
sul pont.
ord.
non vib.
gliss.
pizz.
C


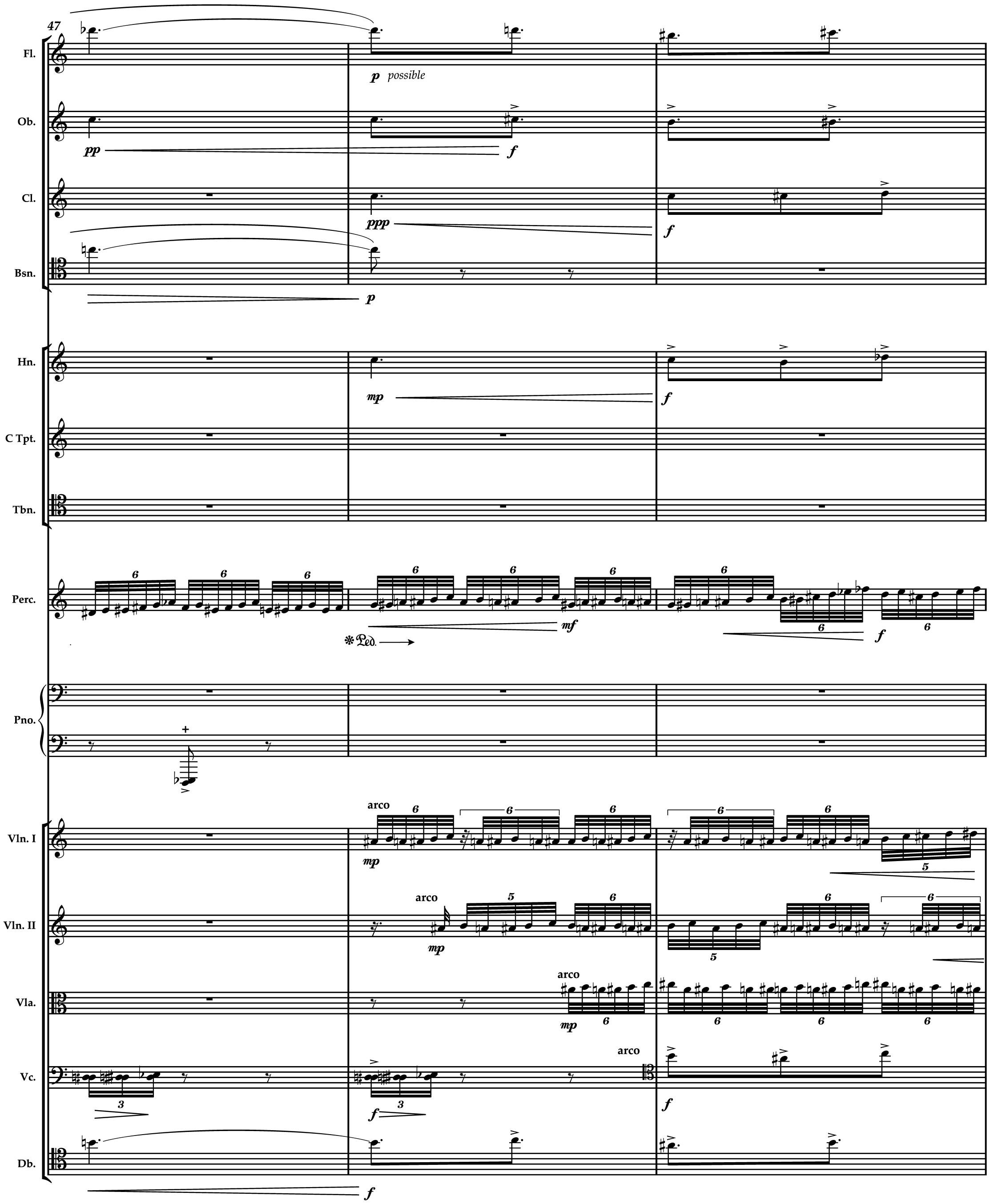
28
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
ord.
ord.
l.v.
TRIANGLE
SUS. CYMBAL
TRIANGLE
BASS DRUM - Superball
crescendo
gliss.
gliss.
pizz.
pizz.
pizz. - gliss.
pizz. - gliss.
arco


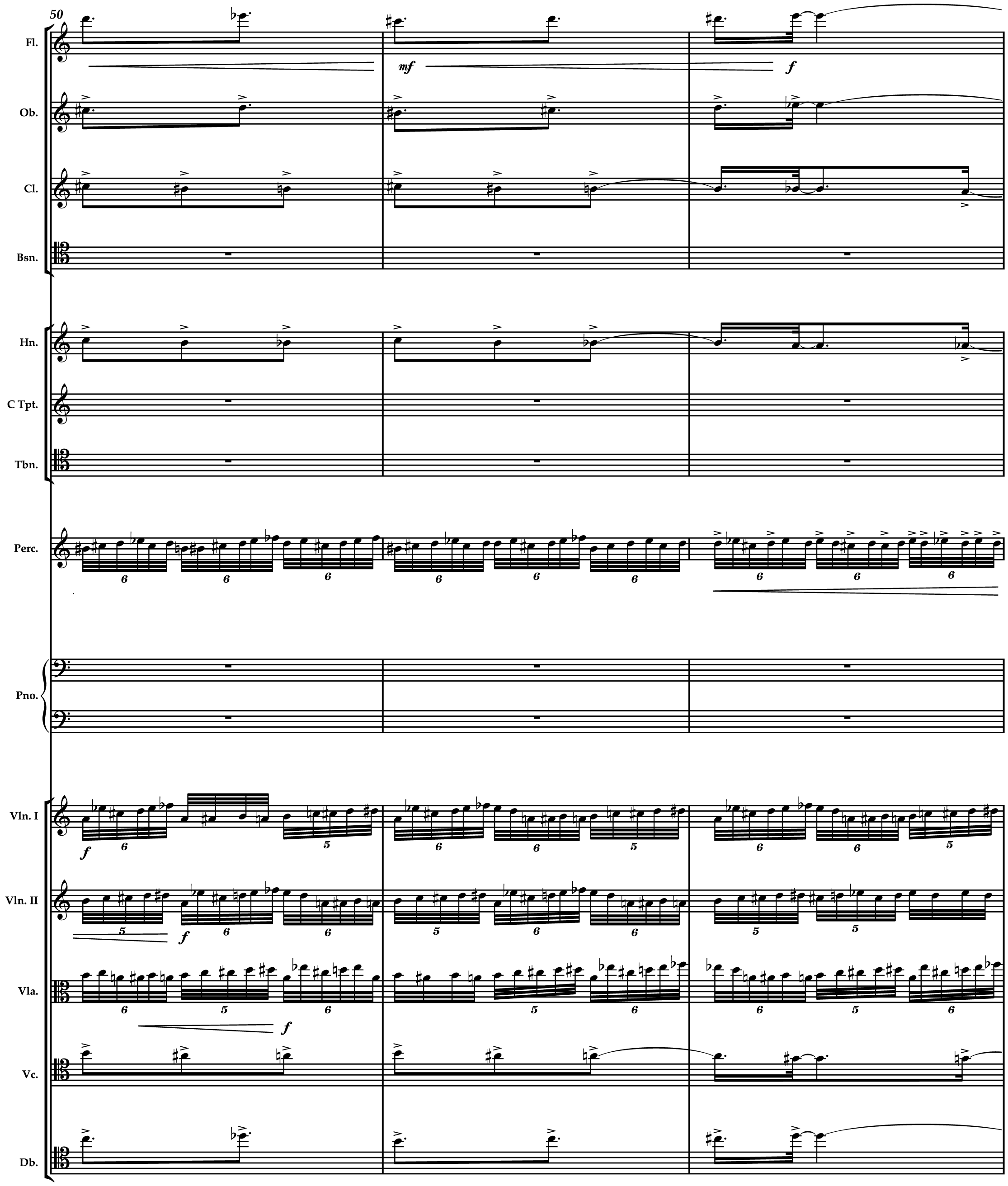
Slower - calm
♪=ca.76
Melancholic - free
♩=ca.42
31
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
pp
Whispa mute
slow gliss.
p
VIBRAPHONE
medium mallets
slow motor
l.v.
arco
mf
arco
ppp
p espress.


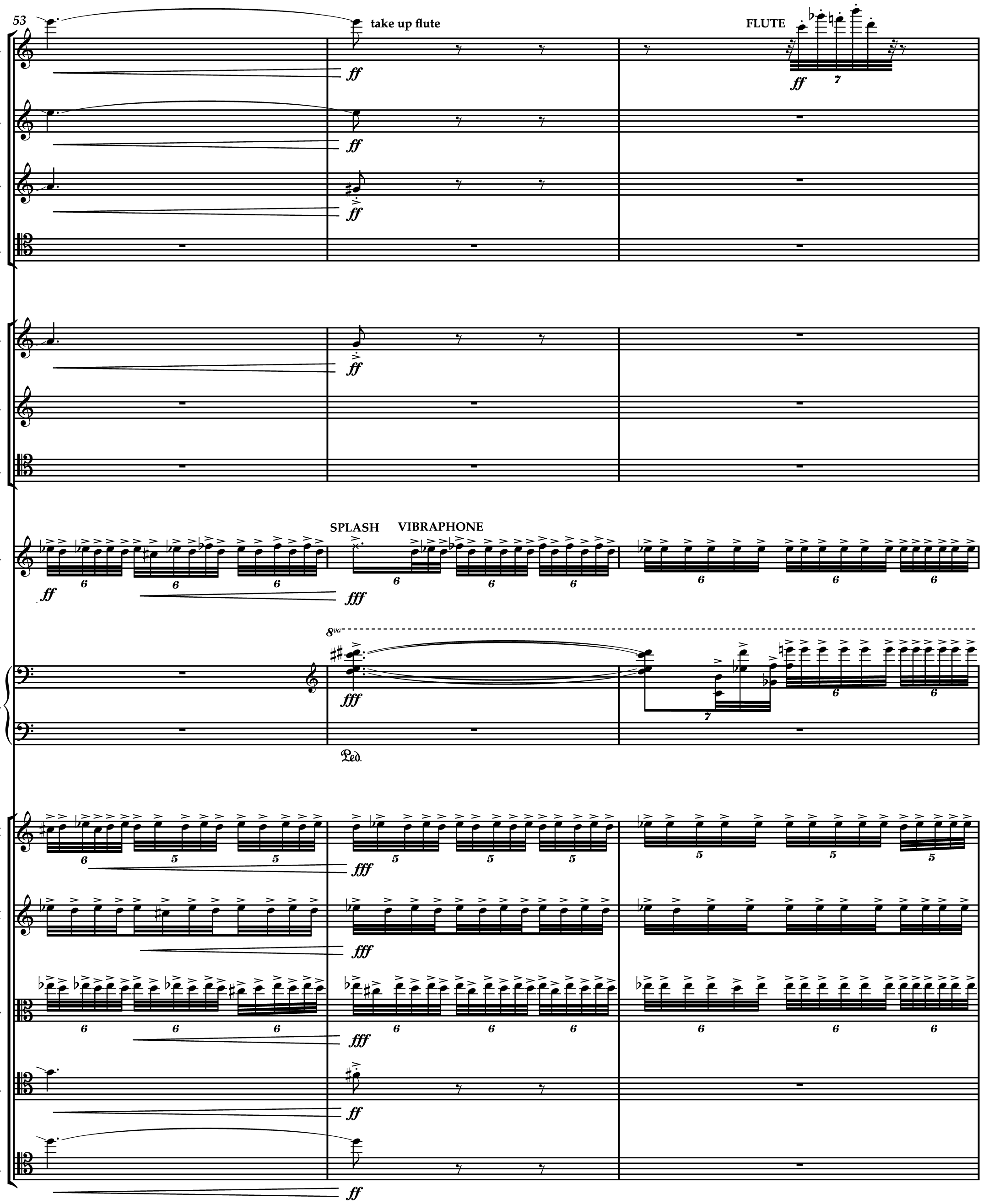
35
Fl.
Ob.
Cl.
Bsn.
Hn.
flz.
C Tpt.
sim.
mute off
Tbn.
harmon mute
Perc.
SUS. CYMBAL
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.


Same tempo - constantly moving forward
39
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
ff
mp
fff
flz.
grotesque
p
f
ord.
VIBRAPHONE
mf
ppp
Ped.
pizz.


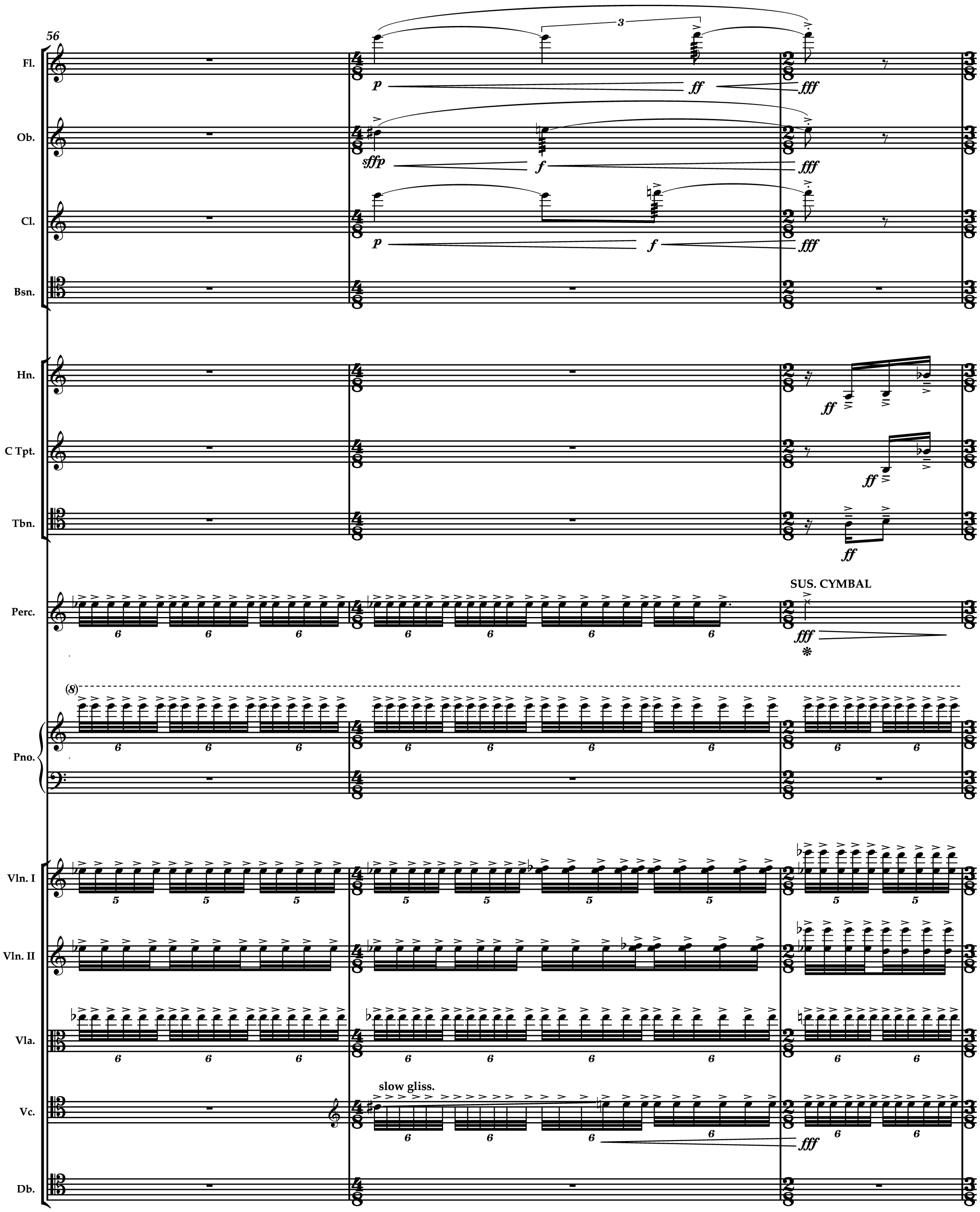
41
Fl.
Ob.
Cl.
Bsn.
Hn.
f
C Tpt.
Tbn.
ord.
f
Perc.
6
Pno.
fff
8vb
Vln. I
Vln. II
Vla.
Vc.
fff
Db.
fff


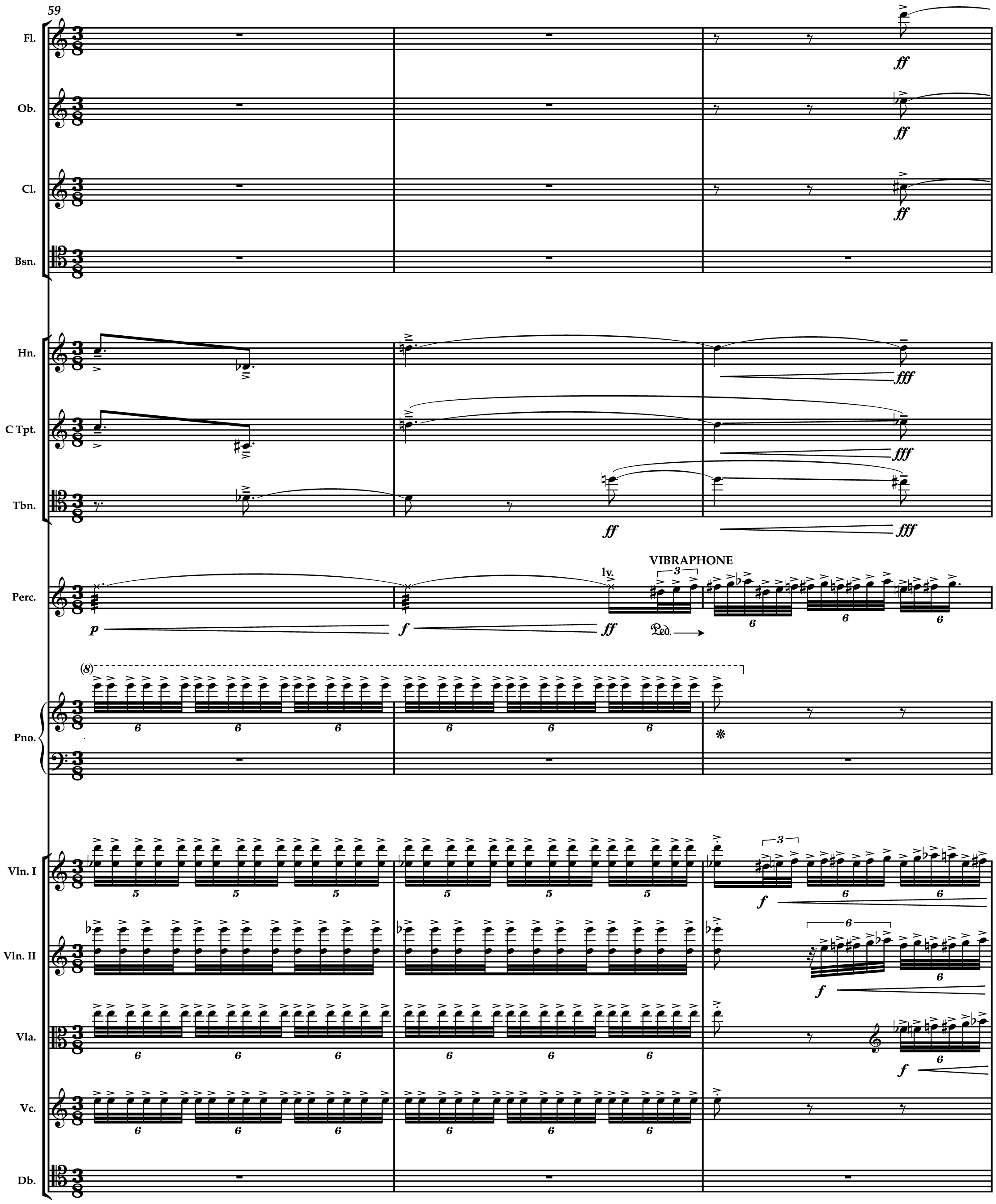
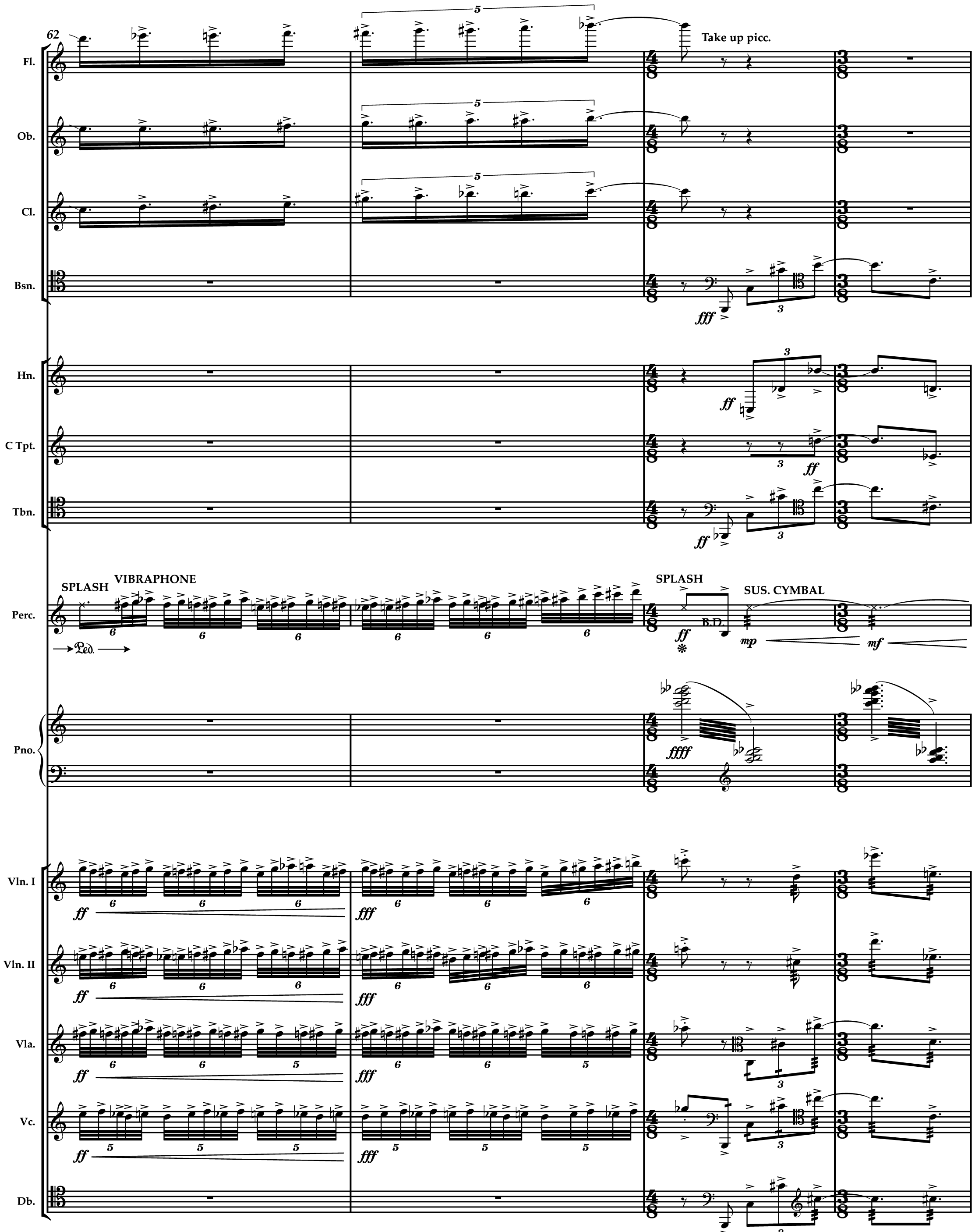
44
PICCOLO
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
gradually release pedal
Vln. I
Vln. II
Vla.
Vc.
Db.
pizz.
arco
ppp
p
mp
f
ff
mf
pp


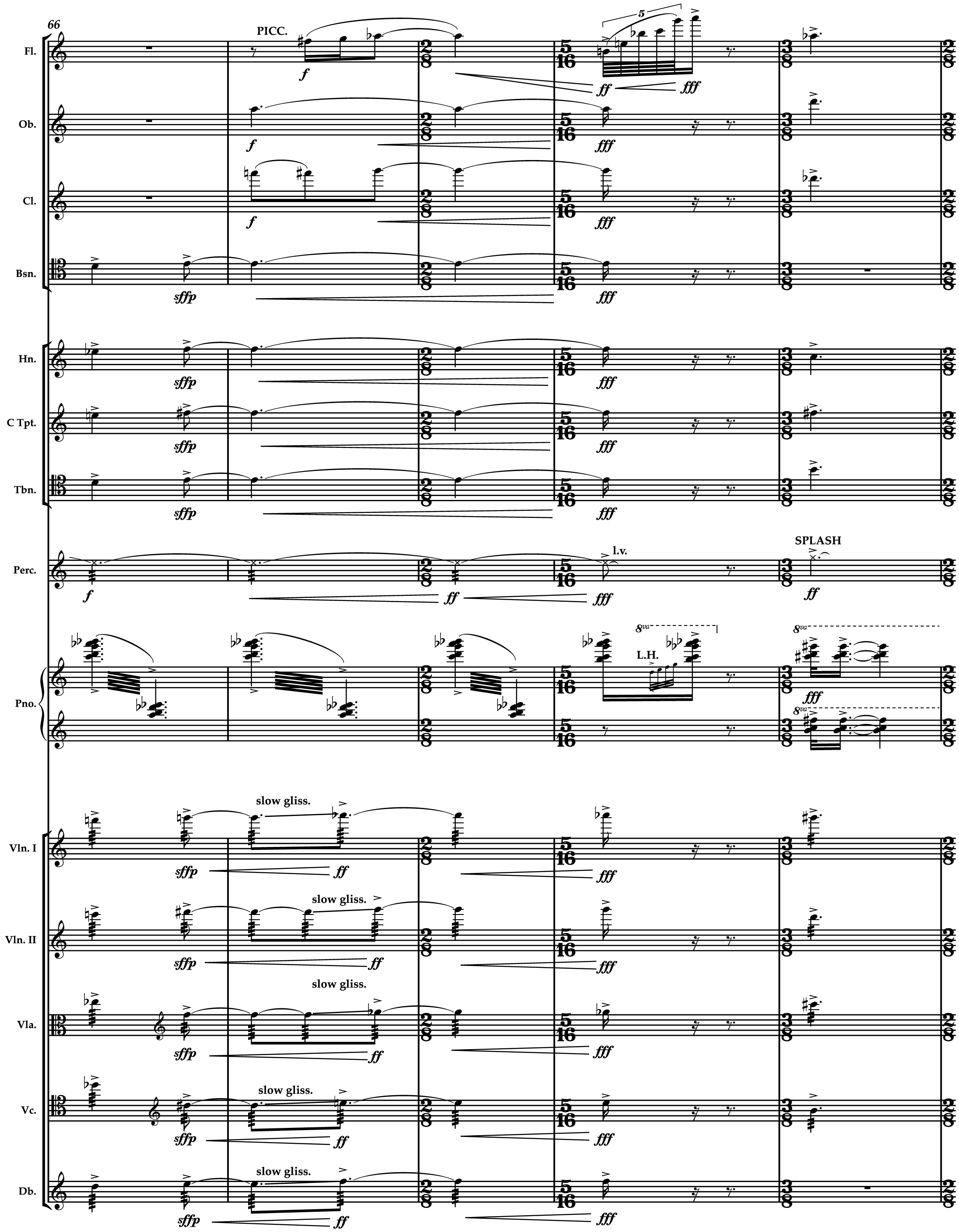
47
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
p possible
pp
f
ppp
p
mp
mf
arco
arco
arco
arco


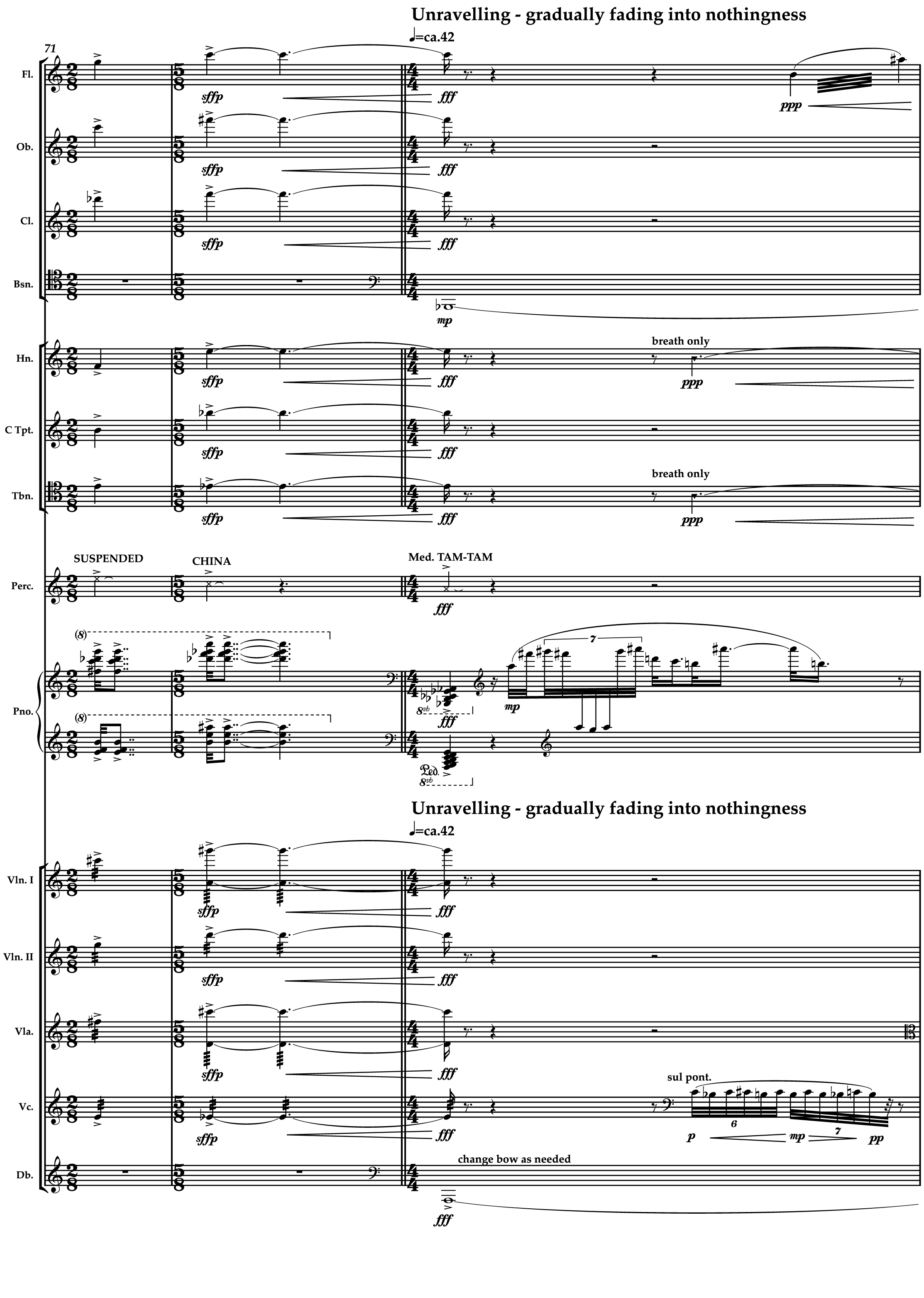
50
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
mf
f


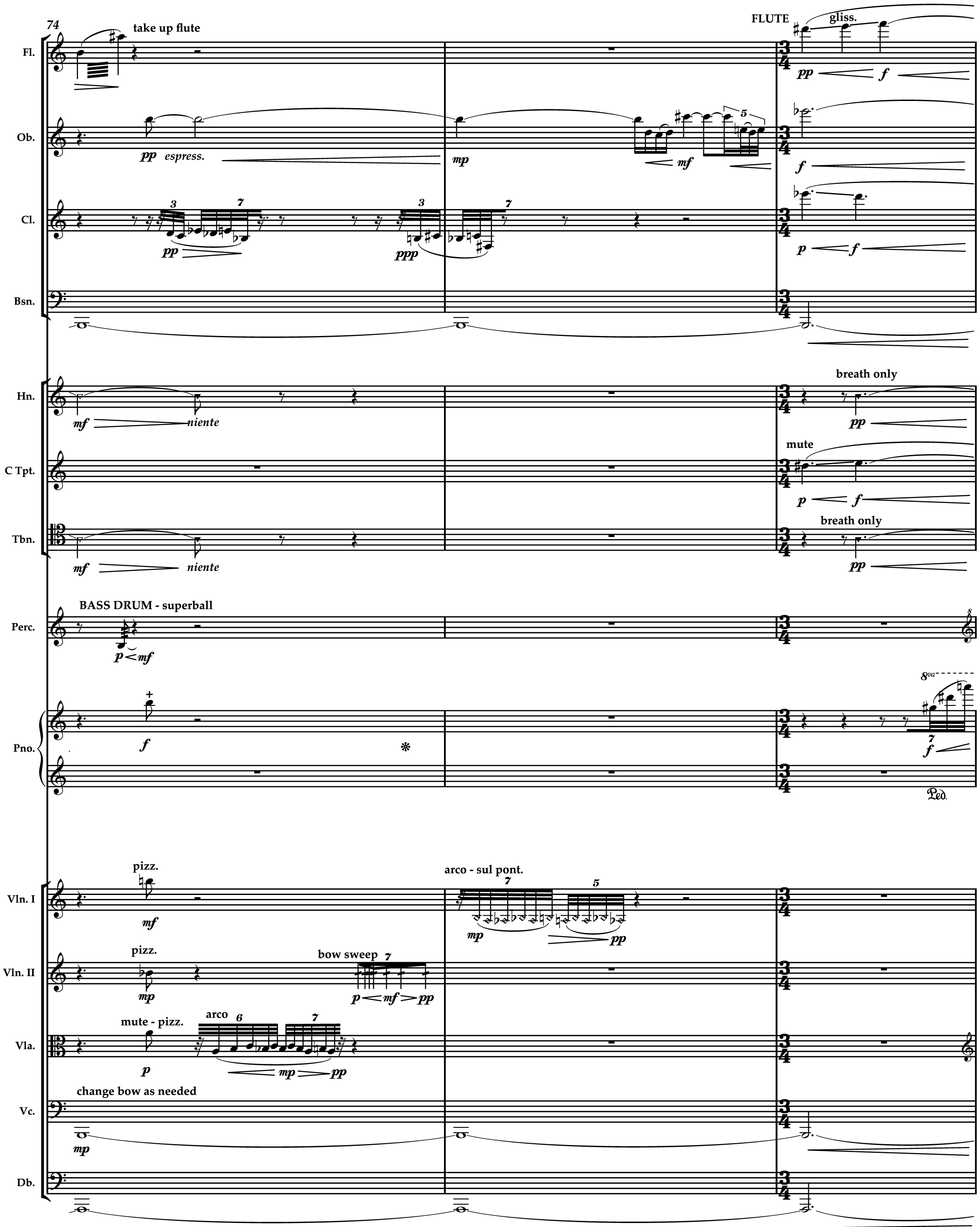
53
Fl.
take up flute
FLUTE
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
SPLASH
VIBRAPHONE
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.

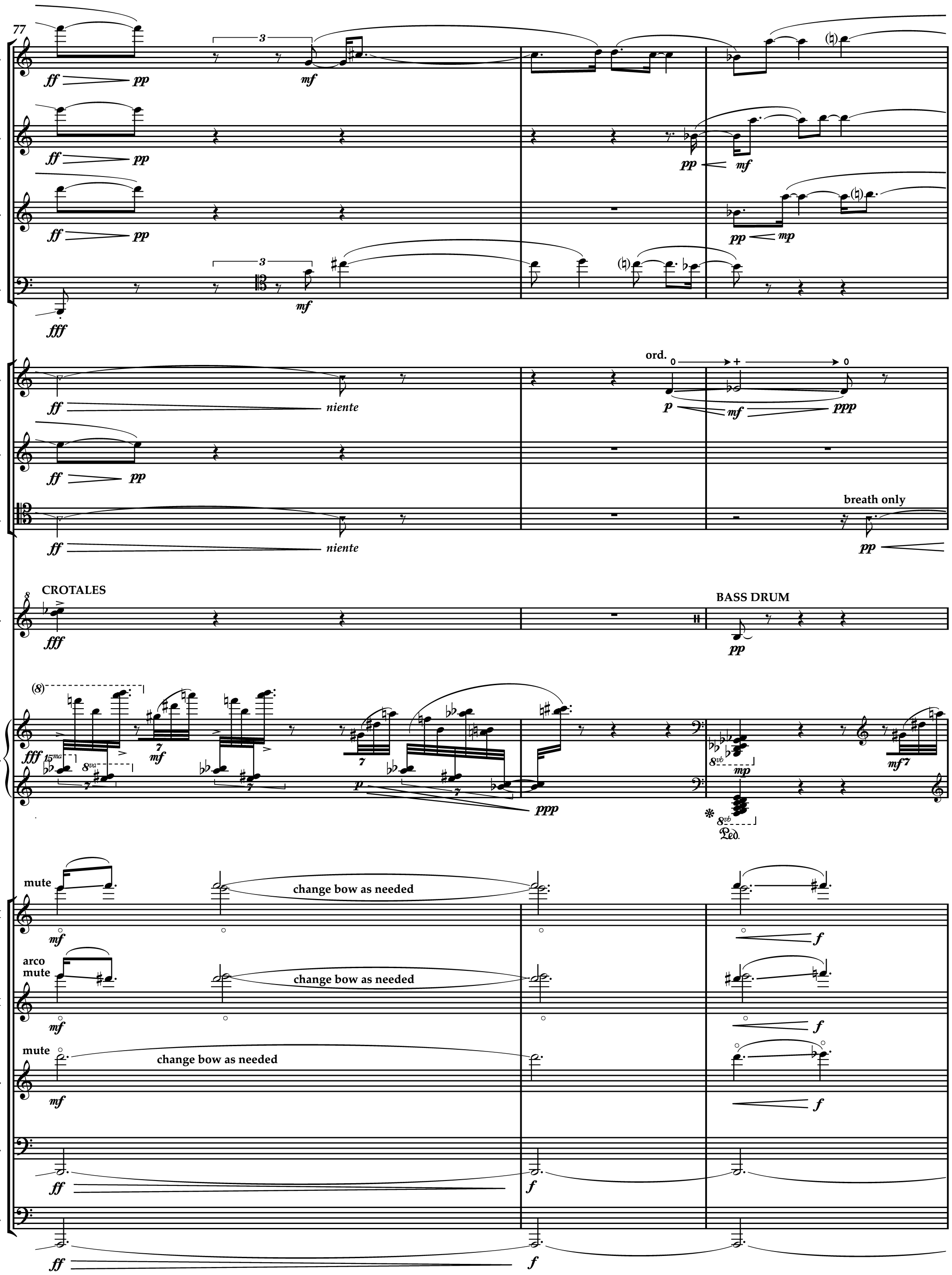

56
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
SUS. CYMBAL
slow gliss.

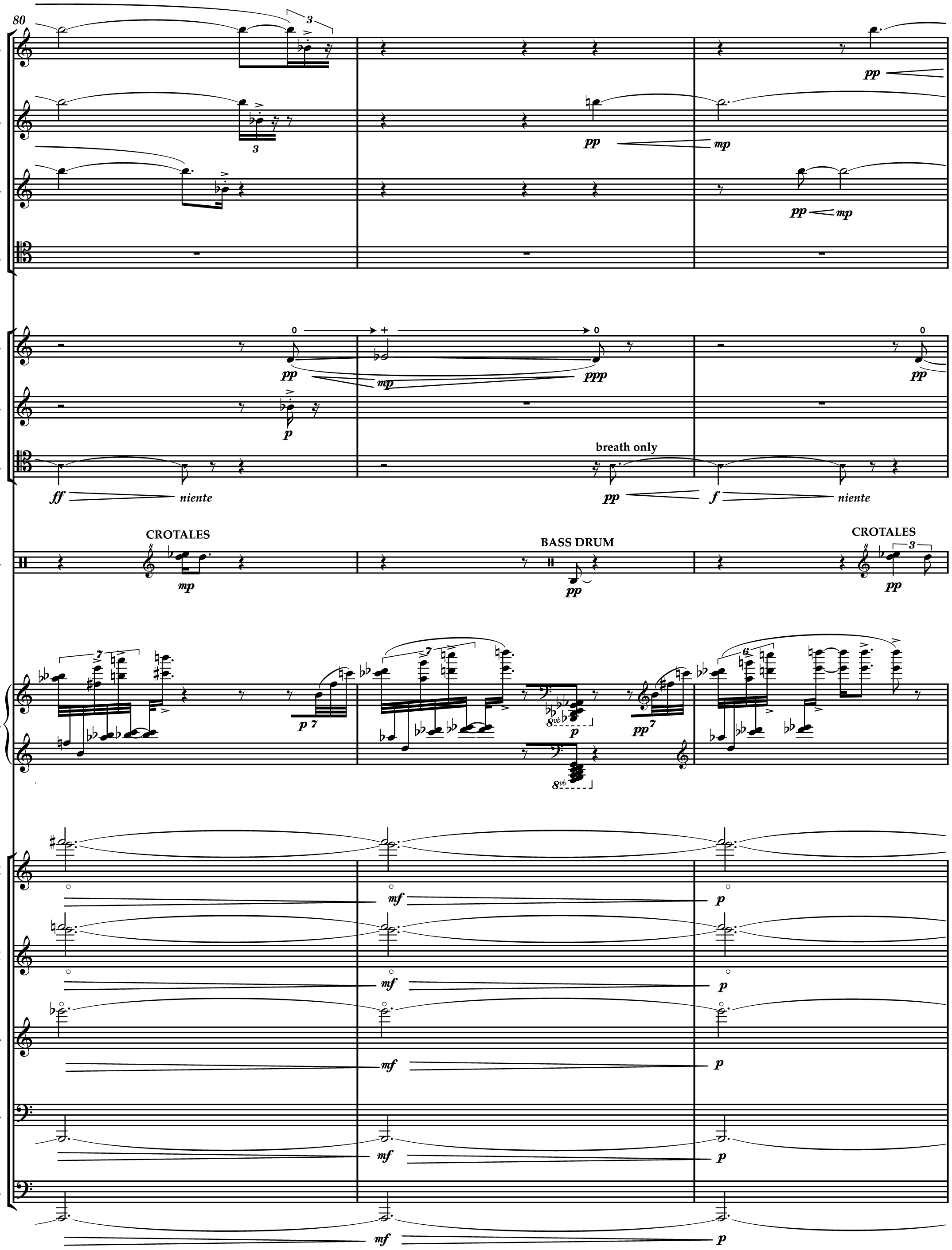

59
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
l.v.
VIBRAPHONE
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.


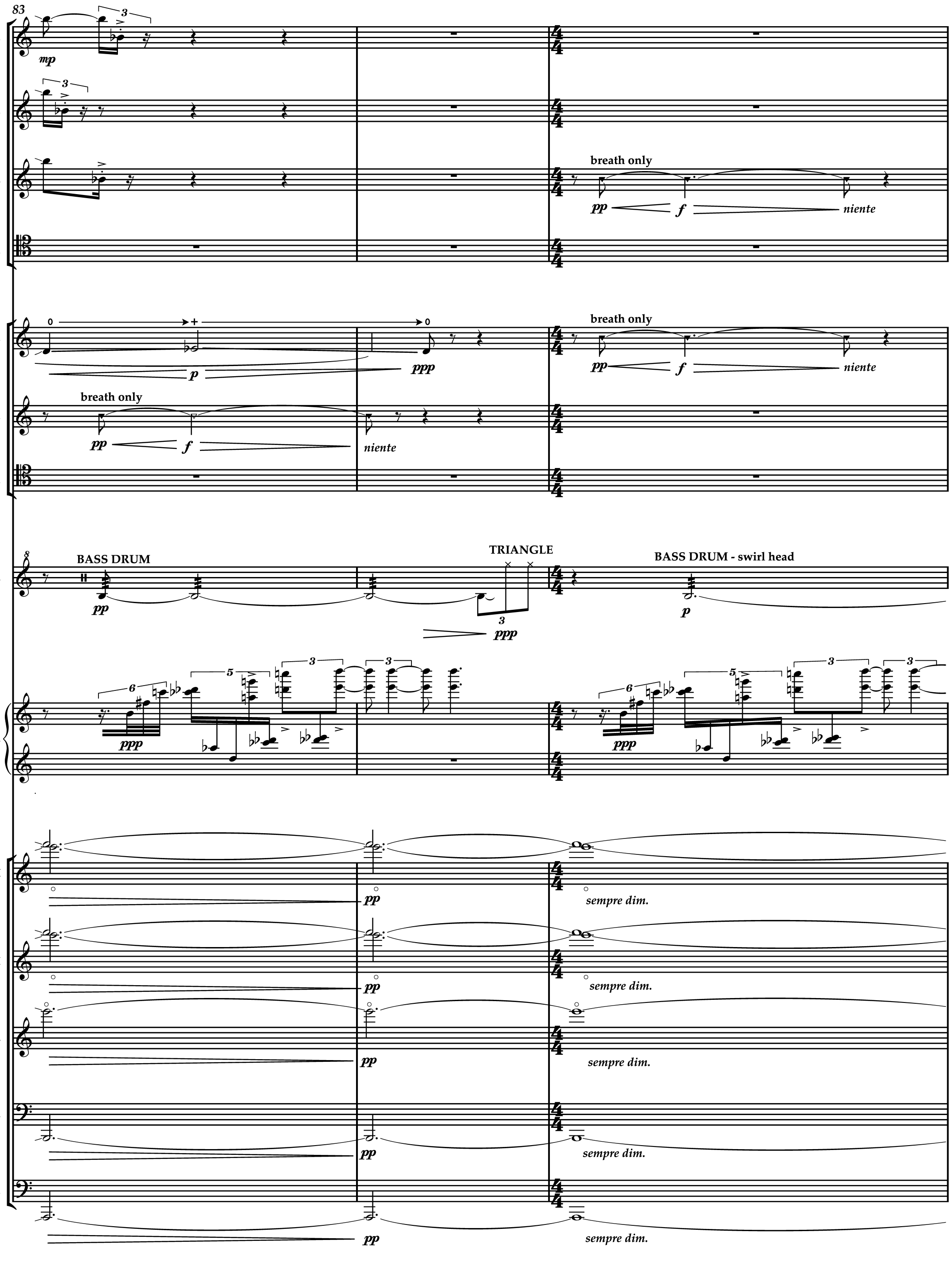
62
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
Take up picc.
SPLASH
VIBRAPHONE
SPLASH
B.D.
SUS. CYMBAL


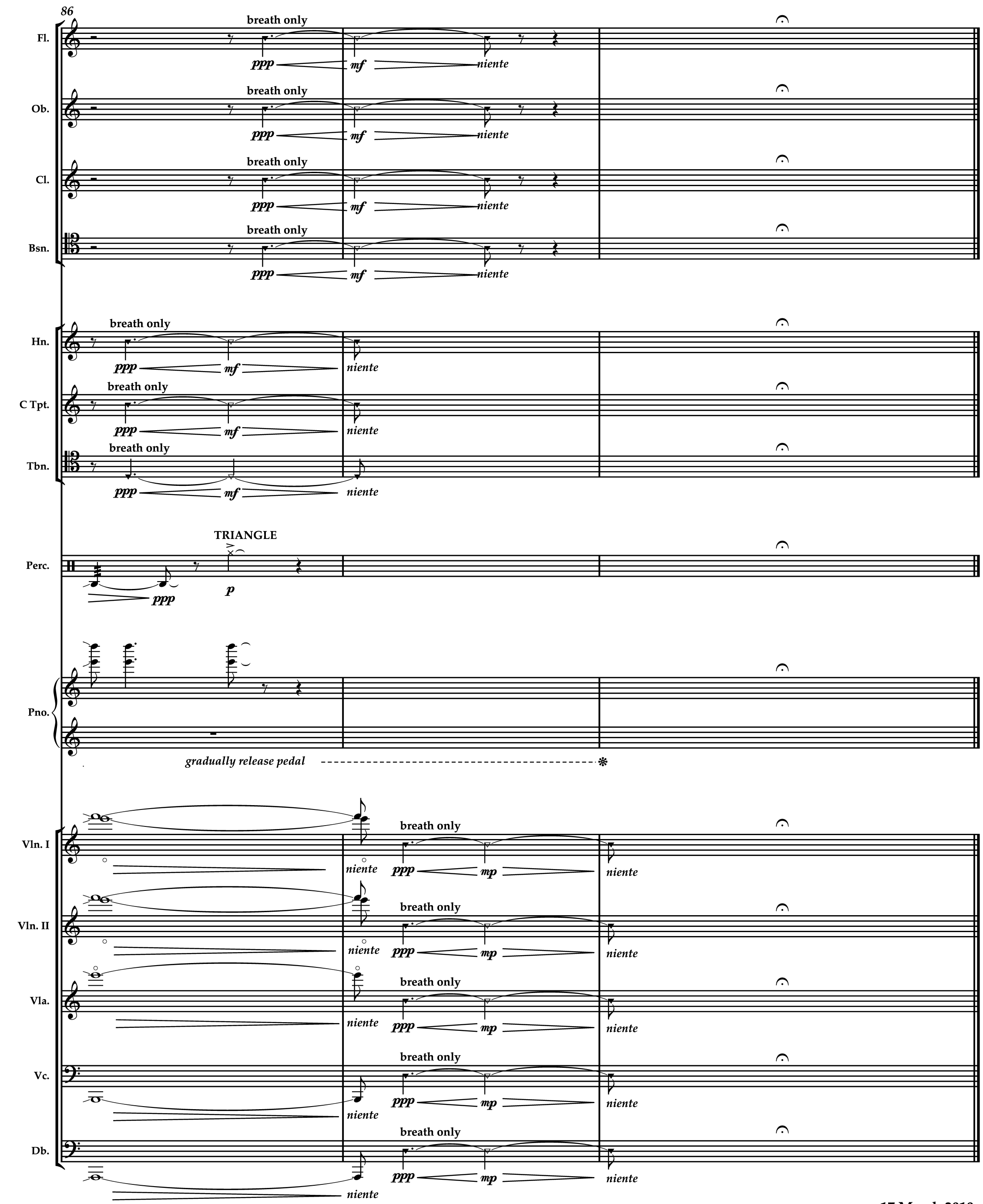
66
PICC.
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
f
sffp
ff
fff
l.v.
SPLASH
L.H.
8va
5
slow gliss.


Unravelling - gradually fading into nothingness
=ca.42
71
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
breath only
SUSPENDED
CHINA
Med. TAM-TAM
sul pont.
change bow as needed


74
take up flute
FLUTE
gliss.
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
espress.
niente
breath only
mute
BASS DRUM - superball
pizz.
arco - sul pont.
bow sweep
mute - pizz.
arco
change bow as needed


77
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
niente
ord.
breath only
CROTALES
BASS DRUM
mute
arco
mute
change bow as needed


80
Fl.
Ob.
Cl.
Bsn.
Hn.
C Tpt.
Tbn.
Perc.
Pno.
Vln. I
Vln. II
Vla.
Vc.
Db.
CROTALES
BASS DRUM
CROTALES
breath only
niente
niente


83
Fl.
mp
Ob.
Cl.
breath only
pp
f
niente
Bsn.
Hn.
p
ppp
C Tpt.
Tbn.
Perc.
BASS DRUM
TRIANGLE
BASS DRUM - swirl head
Pno.
ppp
Vln. I
sempre dim.
Vln. II
Vla.
Vc.
Db.

17 March 2010
Ithaca, NY